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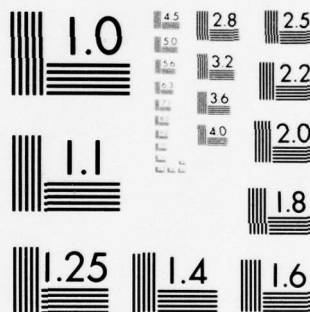
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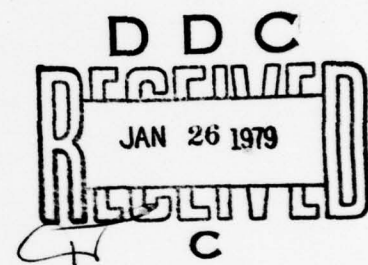
**INTERACTIONAL AERODYNAMICS OF THE SINGLE
ROTOR HELICOPTER CONFIGURATION**

**VOLUME IV-C - One-Third Octave Band Spectrograms
of Wake Split-Film Data, Solid Hubcaps**

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APPLIED TECHNOLOGY LABORATORY POSITION STATEMENT

In 1975 a wind tunnel test program was conducted in the Boeing-Vertol 20-foot V/STOL Wind Tunnel on a 1/5th-scale UTTAS model to investigate and find solutions for several aerodynamic problems encountered during the UTTAS flight-testing. Specifically, these tests focused upon (a) the structure of the hub/rotor wake in the vicinity of the empennage, (b) the formulation of the ground vortex and its relation to hub loads and fuselage loads during transition, and (c) the occurrence of vibratory air pressures from the blade passing over the fuselage. Only portions of the above-mentioned wind tunnel test data were reduced and analyzed in addressing the flight-test problems of the UTTAS aircraft.

Under Contract DAAJ02-77-C-0020, Boeing-Vertol completed analyses on the data to understand more completely the aerodynamic interactions that are involved and to formulate instructions for the guidance of designers in these respects. The results of these studies are applicable to all existing and future single-rotor/tail rotor helicopters. The data have been segregated according to aerodynamic interactions and associated phenomena/problem areas. From this body of knowledge, a generalized set of design guidelines meaningful to the single-rotor helicopter design concept formulation were developed and are included in these reports.

Mr. Robert P. Smith of the Aeronautical Technology Division, Aeromechanics Technical Area, served as project engineer for this effort.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This is the third of seven sub-volumes of Volume IV containing one-third octave band spectrographs of the model helicopter hub/rotor wake as it was modified by various aerodynamic devices. This sub-volume deals with the effects of solid hub caps. Here the cap underside is flat and does not share the upperside camber.		

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PREFACE

The entire report describing the investigation of INTERACTIONAL AERODYNAMICS OF THE SINGLE-ROTOR HELICOPTER CONFIGURATION comprises eight numbered volumes bound as 33 separate documents. The complete list of these documents is as follows:

Volume I, Final Report

Volume II, Harmonic Analyses of Airframe Surface Pressure Data

- A — Runs 7-14, Forward Section
- B — Runs 7-14, Mid Section
- C — Runs 7-14, Aft Section
- D — Runs 15-22, Forward Section
- E — Runs 15-22, Mid Section
- F — Runs 15-22, Aft Section
- G — Runs 23-33, Forward Section
- H — Runs 23-33, Mid Section
- I — Runs 23-33, Aft Section

Volume III, Flow Angle and Velocity Wake Profiles in Low-Frequency Band

- A — Basic Investigations and Hubcap Variations
- B — Air Ejector Systems and Other Devices

Volume IV, One-Third Octave Band Spectrograms of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps
- D — Open Hubcaps
- E — Air Ejectors
- F — Air Ejectors With Hubcaps; Wings
- G — Fairings and Surface Devices

This volume is

Volume V, Harmonic Analyses of Hub Wake

Volume VI, One-Third Octave Band Spectrograms of Wake Single Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Exploration
- C — Hubcaps and Air Ejectors

Volume VII, Frequency Analyses of Wake Split-Film Data

- A — Buildup to Baseline
- B — Basic Configuration Wake Explorations
- C — Solid Hubcaps

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- D - Open Hubcaps
- E - Air Ejectors
- F - Air Ejectors With Hubcaps; Wings
- G - Fairings and Surface Devices

Volume VIII, Frequency Analyses of Wake Single Film Data

- A - Buildup to Baseline
- B - Basic Configuration Wake Exploration
- C - Hubcaps and Air Ejectors

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INTRODUCTION

Volume IV presents spectrograms of the flow angles and velocity components for each run and its test points. Specifically, these machine plots show the root mean square value of each wake parameter over discrete frequency intervals one-third of an octave band in width. The octave arrangement is selected to provide 19 spectral increments from 3.9 to 250.0 Hz centerband frequency. A special computer program is employed to derive wake parameters within these bands consistent with corresponding basic spectral functions depicted in Volume VII.

The graphs showing the one-third octave band values are sequenced in the same order as the Outline of Wake Investigations (Table 1). These graphs are distributed among Volumes IV-A through IV-G by the major categories of Table I in the following arrangement:

Volume IV-A	Build-up to Baseline
Volume IV-B	Basic Configuration
Volume IV-C	Effect of Hub Caps Section 1 & 2
Volume IV-D	Effect of Hub Caps Section 3 & 4
Volume IV-E	Effect of Hub Caps Section 5 and Effect of Air Ejectors
Volume IV-F	Air Ejectors with Open Hub Caps and Effect of Wings and Misc. Section
Volume IV-G	Effect of Wings and Misc. Sections 2 and 3

The Table I outline and other material is included for reference and as a context to the work of each sub-volume. Table 2, the List of Test Runs, arranges the runs in numerical order and gives pertinent text parameters.

The Index of Rake Positions, Table 3, lists the hot film transducer rake positions in the model coordinate system for each run and its test points. The main feature of Table 3 is the indexing of the test point number to the model waterline station and butt line as it varied from run to run. The table groups the runs as they shared the indexing correspondence of point with position. It is emphasized that the runs in a group do not necessarily all share the same number of test points but they do have same correspondence within their respective ranges of test points.

The orientation of the rake is shown pictorially in Figures 1 through 6 for the various test runs. Figure 7 presents a scaled drawing of the model with reference to the three-axis coordinate system. Table 4 lists the center frequency and the upper and lower band limits for each of the numbered one-third octave bands.

TABLE 1

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code	Run No.	Base-line
<u>Build-up to Baseline</u>			
1. Nacelles removed	$K_{13}+H_1-N$	149	150
2. Blades off, rotating hub	$K_{13}-M+H_{1.0}$	160	156
3. " " , non-rotating hub	$K_{13}-M+H_{1.0}$	158	156
4. " " , hub off	$K_{13}-M-H_{1.0}$	159	156
<u>Basic Configuration</u>			
1. <u>Wake Explorations near Empennage</u>			
(a) 15" Long. + traverse at T/R C.L.	K_{11}	111	---
(b) 9" Vert. + " above T/R "	"	112	---
(c) 2" " " in vortex	"	113	---
(d) 8" " " (continue 112)	"	114	---
(e) 13" " " behind stab.	"	115	---
(f) Lateral traverse, left stab. (One T.P. only)	"	116	---
(g) Same continued	"	117	---
(h) Same continued (One T.P. only)	"	118	---
(i) Lateral traverse right stab.	"	119	---
(j) T/R effect on wake	$K_{11}+T_2^0$	121	115
2. <u>Climb/Descent Studies</u>			
(a) Climb 900 FPM	K_{11}	135	---
(b) Descent 800 FPM	"	136	---
<u>Effect Of Hub Caps</u>			
1. <u>Solid Caps on Canister</u>			
(a) 7.6" diam. 2.17" ht. soft Pitch Arms	$K_{11}-H_{1.0}+H_{1.2}$	137	136
(b) 7.6" diam. 2.17" ht. stiff Pitch Arms	$K_{13}+H_{1.2}$	153	156
(b) 7.6" diam. 2.45" ht. flt. test config.	$K_{13}+H_{1.2.1}+I_1+E_{1.0}$	207	188

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>Effect of Hub Caps (Continued)</u>			
2. <u>Solid Caps Raised Above Canister</u>			
(a) 7.6" diam. 2.45" ht. 70" depth, .55 gap	H _{1.2.2} +I ₁ +E _{1.0}	208	188
(b) 10.0" diam. 3.25" ht. 1.55" depth, .50" gap	H _{1.8.1} +I ₁ +E _{1.0}	189	188
(c) 10.0" diam. 4.125" ht. 2.05" depth, .875" gap	H _{1.8.2} +I ₁ +E _{1.0}	190	188
(d) Repeat of 189	" " "	210	188
3. <u>Open Caps Without Underbody</u>			
(a) 10.0" diam. 1.25" gap, blades	H _{1.0.2} +I ₁ +E _{1.0}	193	188/166
(b) " " " gap, no blades	H _{1.0.1} -M	166	158
(c) " " 2.05" gap, blades	H _{1.14.1} +I ₁ +E _{1.0}	211	188
(d) " " 1.75" gap, no blades	H _{1.0.1} -M	165	158
(e) " " 1.87" gap, blades	H _{1.0.3} +I ₁ +E _{1.0}	191	188
(f) 16" diam. 2.00" gap, blades	H _{1.7.1}	168	156/167
(g) " " " gap, no blades	H _{1.7.1} -M	167	158
(h) " " 4.00" gap, blades	H _{1.7.2}	169	156
4. <u>Open Caps with Underbody</u>			
(a) 7.6" diam. 1.25" gap	H _{1.11.1} +I ₂ +E _{1.0}	194	188
(b) " " " "	H _{1.11.1} +I ₂ +E _{4.0}	198	188
(c) " " " " center post	H _{1.11.2} +I ₂	202	194
(d) 10.0" diam. .5" gap, no blades	H _{1.5.1} -M	164	158
(e) " " 1.25" gap, no blades	H _{1.5.2} -M	161	158
(f) " " 2.0" gap, no blades	H _{1.5.4} -M	163	158
(g) " " 4.0" gap, no blades	H _{1.5.3} -M	162	158
(h) " " 1.25" gap	H _{1.5.2}	154	156/161
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
<u>5. Miscellaneous Hub Covers</u>			
(a) Hub fairing 16" diam.	H _{1.3}	151	150
(b) Wham-O-Frisbee 10" diam.	H _{1.9.0} +E _{1.2}	182	181
(c) Fab. glass Frisbee 16" diam.	H _{1.9.1} +E _{1.2}	183	181
<u>Effect of Air Ejectors</u>			
1. Basic system no blowing	H _{1.0} +E _{1.0}	172	156
2. " " 40 psi	" "	173	156/172
3. " " 150 psi	" "	174	156/172
4. Wide chord shroud 40 psi	H _{1.0} +E _{2.5.1}	175	156/173
5. Wide " " 150 psi	" "	176	156/174
6. W/C shroud w. lip 40 psi	H _{1.0} +E _{3.5.2}	184	156/173
7. Same Contoured Parallel 150 psi	H _{1.0} +E _{3.5.4}	187	156/174
8. Bifurcated duct 0 psi	H _{1.0} +E _{5.0}	203	156
9. " " 40 psi	" "	204	156/203
10. " " 150 psi	" "	205	156/203
<u>Air Ejectors with Open Hub Caps with Underbodies</u>			
1. 7.6" diam. 1.25" gap, 0 psi	H _{1.11.1} +I ₂ +E _{1.0}	194	188/172
2. " " " " 20 psi	" " "	195	188
3. " " " " 40 psi	" " "	196	188/173
4. " " " " 150 psi	" " "	197	188/174
5. " " " " 0 psi	H _{1.11.1} +I ₂ +E _{4.0}	198	188/194
6. " " " " 40 psi	" " "	199	188/196
7. " " " " 150 psi	" " "	200	188/196
8. Same with center post	H _{1.11.2} +I ₂ +E _{4.6}	201	188/200
9. 10.0" diam. 2.0" gap wide ch'd. shroud (150 psi)	H _{1.5.4} +E _{2.5.1}	177	156/176
<u>Effect of Wings and Misc.</u>			
1. Wings			
(a) Nacelle-mounted stub wing	H _{1.0} +W _{1.0} +E _{1.1}	178	181
(b) Single slotted flapped wing	H _{1.0} +W _{3.0} +E _{1.0}	180	181
(c) Double slotted flapped wing	H _{1.0} +W _{2.0} +E _{1.0}	179	181
(d) Boom-mounted stub wing	H _{1.0} +W _{4.0}	186	156
*Basic Code is K13.			

TABLE 1 (CONTINUED)

OUTLINE OF WAKE INVESTIGATIONS

Description	Configuration Code*	Run No.	Base-line
2. Crown Fairings			
(a) Flat top behind shaft	K ₁₁ +D ₁	140	138
(b) Round top behind shaft	K ₁₁ +D ₂	141	138
(c) Extended flat top fairing	H ₁ +D ₄	170	156
(d) Flat top + 16" cap, 4" gap	H ₁ .7.2+D ₄	171	170
(e) Forward fairing/nacelle fairing	P ₁ .0	152	156
3. Surface Devices			
(a) Vortex generators	K ₁₁ +VG _{2.1}	139	138
(b) Guidevane between nacelles	K ₁₁ +FV ₁	142	138
(c) Longitudinal strakes	H ₁ .5.3+S ₄	155	156
(d) 14% porosity spoiler	K ₁₁ +X ₁	143	138
*Basic Code is K13 unless noted otherwise.			

TABLE 2
LIST OF TEST RUNS
BASIC INVESTIGATIONS OF THE HUB WAKE

RUN NO.	CONFIGURATION/CONDITION	V _{TUN} KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. /d	TAIL ROTOR
					α°	ψ°		
111	K ₁₁ /15" Long. wake traverse at TR center line	80	1433/0	8	6.0	-2.0	∞	Off
112	" /9" Vert. wake traverse above TR center line	"	"	"	"	"	"	"
113	" /2" Vert traverse through MR vortex	"	"	"	"	"	"	"
114	" /8" Vert. traverse below TR center line	"	"	"	"	"	"	"
115	" /13" Vert. traverse behind stabilizer	"	"	"	"	"	"	"
116	" /Lateral traverse - left stabilizer	"	"	"	"	"	"	"
117	" /116 continued	"	"	"	"	"	"	"
118	" /116 continued	"	"	"	"	"	"	"
119	" /Lateral traverse - right stabilizer	"	"	"	"	"	"	"
121	K ₁₁ +T ₂ /Effect of tail rotor flow on wake	"	1433/4500	"	"	"	"	On
135	K ₁₁ /Wake in 900 fpm climb	"	"	"	-6.0	-4.5	"	Off
136	" /Wake in 800 fpm descent	"	"	"	6.0	-2.0	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
137	$K_{11}-H_{1.0}+H_{1.2}$ /Effect of 7.6 inch diam. solid hub cap	80	1433/0	8	6	-3.8	∞	Off
138	K_{11} /Repeat of base run	"	"	"	"	"	"	"
139	$K_{11}+VG_{2.1}$ /Effect of vortex generators on aft crown	"	"	"	"	"	"	"
140	$K_{11}+D_1$ /Flat-topped "doghouse" fairing on aft crown	"	"	"	"	"	"	"
141	$K_{11}+D_2$ /Rounded-top fairing	"	"	"	"	"	"	"
142	$K_{11}+FV_1$ /Deflection vane on crown between nacelles	"	"	"	"	"	"	"
143	$K_{11}+X_1$ /Variable porosity spoiler	"	"	"	"	"	"	"
149	$K_{13}+H_{1-N_1}$ /Effect of nacelles off also add stiff pitch arms (K_{13})	60	1075/0	4.5	"	"	"	"
150	$K_{13}+H_1$ /60 knot baseline	"	"	"	"	"	"	"
151	$K_{13}+H_{1.3}$ /16 inch diam. helmet fairing	"	"	"	"	"	"	"
152	$K_{13}+P_{1.0}$ /Pylon and intake fairings	80	1433/0	8	"	"	"	"
153	$K_{13}+H_{1.2}$ /Repeat 137 with K_{13} pitch arms	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
154	K ₁₃ +H ₁ 5.2/10" open hub cap, 7" underbody, 1.25" gap	80	1433/0	8	6	-3.8	∞	Off
155	K ₁₃ +H ₁ 1.5.2+S ₄ /Same as 154 except strakes on aft crown	"	"	"	"	"	"	"
156	K ₁₃ +H ₁ 1.0/Baseline with K ₁₃ , i.e., stiff pitch arms	"	"	"	"	"	"	"
158	K ₁₃ -M+H ₁ 1.0/Wake studies with blades off, hub not rotating	"	0/0	"	"	"	"	"
159	K ₁₃ -M-H ₁ 1.0/Wake studies with hub off	"	"	"	"	"	"	"
160	K ₁₃ -M+H ₁ 1.0/Same as 158 except hub is rotating	"	1433/0	"	"	"	"	"
161	K ₁₃ -M+H ₁ 1.5.2/Repeat of 154 without blades	"	0/0	"	"	"	"	"
162	K ₁₃ -M+H ₁ 1.5.3/Same as 161 except 4" gap	"	"	"	"	"	"	"
163	K ₁₃ -M+H ₁ 1.5.4/Same as 161 except 2" gap	"	"	"	"	"	"	"
164	K ₁₃ -M+H ₁ 1.5.1/Same as 161 except 0.5" gap	"	"	"	"	"	"	"
165	K ₁₃ -M+H ₁ 1.0.1/10" open hub cap, no underbody, same cap vert. position as Run 154	"	"	"	"	"	"	"
166	K ₁₃ -M+H ₁ 1.0.2/Same as 165 with cap lowered by 0.5"	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
167	K ₁₃ -M+H _{1.7.1} /16" open cap, no underbody, 2" gap	80	0/0	8	6	-3.8	∞	Off
168	K ₁₃ +H _{1.7.1} /Blades on, same cap config. as 167	"	1433/0	"	"	"	"	"
169	K ₁₃ +H _{1.7.2} /16" open cap, no underbody, 4" gap	"	"	"	"	"	"	"
170	K ₁₃ +H _{1.0} +D _{4.0} /Extended flat top fairing on aft crown	"	"	"	"	"	"	"
171	K ₁₃ +H _{1.7.2} +D _{4.0} /Same fairing as 170, same cap as 169	"	"	"	"	"	"	"
172	K ₁₃ +H _{1.0} +E _{1.0} (0psi)/Basic air ejector zero blowing baseline	"	"	"	"	"	"	"
173	K ₁₃ +H _{1.0} +E _{1.0} (40 psi)/Same as 172 with 40 psi supply	"	"	"	"	"	"	"
174	K ₁₃ +H _{1.0} +E _{1.0} (150 psi)/Same as 172 with 150 psi supply	"	"	"	"	"	"	"
175	K ₁₃ +H _{1.0} +E _{2.5.1} (40 psi)/Ejector with wide chord shroud at 40 psi	"	"	"	"	"	"	"
176	K ₁₃ +H _{1.0} +E _{2.5.1} (150 psi)/Same as 174 with 150 psi supply	"	"	"	"	"	"	"
177	K ₁₃ +H _{1.5} ⁴ +E _{2.5.1} (150 psi)/Same as 176 with 10" cap like 163	"	"	"	"	"	"	"
178	K ₁₃ +H _{1.0} +W _{1.0} +E _{1.1} (0 psi)/Nacelle mounted wing	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
179	K13+H1.0+W2.0+E1.0 (0 psi)/Double slotted flapped wing	80	1433/0	8	6	-3.8	∞	Off
180	K13+H1.0+W3.0+E1.0 (0 psi)/Single slotted flapped wing	"	"	"	"	"	"	"
181	K13+H1.0+E1.2 (0 psi)/Baseline with ejector tube moved aft	"	"	"	"	"	"	"
182	K13+H1.9.0+E1.2 (0 psi)/Standard 10" frisbee	"	"	"	"	"	"	"
183	K13+H1.9.1+E1.2 (0 psi)/16" fabricated frisbee	"	"	"	"	"	"	"
184	K13+H1.0+E3.5.2 (40 psi)/Wide chord with lip at 40 psi	"	"	"	"	"	"	"
185	K13+H1.0+E3.5.2 (150 psi)/Same as 184 with 150 psi air	"	"	"	"	"	"	"
186	K13+H1.0+W4.0/Boom mounted stub wing	"	"	"	"	"	"	"
187	K13+H1.0+E3.5.4 (150 psi)/Like 185 with modified shroud	"	"	"	"	"	"	"
188	K13+H1.0+I1+E1.0 (0 psi)/Baseline with I1 instr. ring	"	"	"	"	"	"	"
189	K13+H1.8.1+I1+E1.0 (0 psi)/Solid cap, 10" diam. 3.25" height	"	"	"	"	"	"	"
190	K13+H1.8.2+I1+E1.0 (0 psi)/Same as 189 except + 4.12" height	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
191	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.87" gap	80	1433/0	8	6	-3.8	∞	Off
193	K13+H1.0.2+I1+E1.0 (0 psi)/10" cap, no underbody, 1.25" gap	"	"	"	"	"	"	"
194	K13+H1.11.1+I2+E1.0 (0 psi)/7.6" cap, underbody, 1.25" gap	"	"	"	"	"	"	"
195	K13+H1.11.1+I2+E1.0 (20 psi)/Same as 194 with 20 psi air	"	"	"	"	"	"	"
196	K13+H1.11.1+I2+E1.0 (40 psi)/Same as 194 with 40 psi air	"	"	"	"	"	"	"
197	K13+H1.11.1+I2+E1.0 (150 psi)/Same as 194 with 150 psi air	"	"	"	"	"	"	"
198	K13+H1.11.1+I2+E4.0 (0 psi)/Same as 194 except blowing tube 2" aft	"	"	"	"	"	"	"
199	K13+H1.11.1+I2+E4.0 (40 psi)/Same as 198 with 40 psi air	"	"	"	"	"	"	"
200	K13+H1.11.1+I2+E4.0 (150 psi)/Same as 198 with 150 psi air	"	"	"	"	"	"	"
201	K13+H1.11.2+I2+E4.0 (150 psi)/Same as 200 except center support cap	"	"	"	"	"	"	"
202	K13+H1.11.2+I2/Baseline with I2 and no blowing tube	"	"	"	"	"	"	"
203	K13+H1.0+E5.0 (0 psi)/Bifurcated air duct baseline	"	"	"	"	"	"	"

TABLE 2 (CONTINUED)
LIST OF TEST RUNS
EVALUATION OF WAKE-ALTERING DEVICES

RUN NO.	CONFIGURATION/CONDITION	VTUN KNOTS	RPM MR/TR	DISK LDG. psf	MODEL ANGLES		MR HT. h/d	TAIL ROTOR
					α°	ψ°		
204	K13+H1.0+E5.0 (150 psi)/Bifurcated duct with 150 psi air	80	1433/0	8	6	-3.8	∞	Off
205	K13+H1.0+E5.0 (40 psi)/Same as 204 with 40 psi air	"	"	"	"	"	"	"
207	K13+H1.2.1+I1+E1.0 (0 psi)/7.6" solid cap, no gap	"	"	"	"	"	"	"
208	K13+H1.2.2+I1+E1.0 (0 psi)/Same as 207 except 0.55" gap	"	"	"	"	"	"	"
210	K13+H1.15.1+I1+E1.0 (0 psi)/Repeat of 189	"	"	"	"	"	"	"
211	K13+H1.14.1+I1+E1.0 (0 psi)/Like 189 and 210 except cap is open	"	"	"	"	"	"	"

TABLE 3					
INDEX TO RAKE POSITIONS					
RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
111	20	53.5	103.1	-7.25	1
	21	"	"	"	
	22	"	105.0	"	
	24	"	107.0	"	
	26	"	109.0	"	
	28	"	111.0	"	
	30	"	112.9	"	
	32	"	114.9	"	
	34	"	116.9	"	
	36	"	118.9	"	
112	2	48.9	107.3	-7.25	1
	4	50.8	"	"	
	6	52.7	103.3	"	
	8	54.5	"	"	
	10	56.2	"	"	
	12	57.2	"	"	
113	2	51.7	103.3	-3.25	1
	4	52.3	"	"	
	6	52.8	"	"	
	8	53.3	"	"	
	10	53.9	"	"	
	11	53.3	"	"	
114	2	44.5	103.0	-3.25	1
	4	46.4	"	"	
	6	48.2	"	"	
	8	50.0	"	"	
	10	51.9	"	"	
115	3	52.9	124.7	-3.25	1
	4	52.0	"	"	
	6	50.0	"	"	
	9	48.0	"	"	
	10	46.0	"	"	
	12	44.1	"	"	
	14	42.1	"	"	
	16	53.0	"	"	
	18	54.0	"	"	
	20	55.0	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
116	7	36.9	100.5	-17.5	1
117	2 4 6 8 10	37.6 " 37.3 " "	100.5 " 99.6 " "	-16.0 -14.0 -12.0 -10.0 - 8.0	1
118	2	37.6	100.5	- 6.0	1
119	2 5 8 9 14 16 20 25	37.3 " " " " " 51.5 52.3	99.6 " " " " " 102.5 101.7	+ 6.0 8 10 " 14 16 17.5 -17.5	1
121	3 4 6 8 10	62.9 53.5 50.1 46.0 42.1	129.0 " " " "	+ 5.7 " " " "	2
135	2 4 6 8 10 12 14	56.9 54.5 52.5 50.5 48.5 46.5 44.5	106.3 " " " " " "	- 5.7 " " " " " "	3
136	2 4 6 8 10 12 14 17 18 19	56.5 54.5 52.5 50.6 48.5 46.5 44.5 37.1 39.0 41.0	104.0 " " " " " " " " " "	- 8.0 " " " " " " " " " "	4

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
137	3	38.7	98.4	- 8.0	5
	5	39.9	"	"	
	7	42.0	100.5	"	
	9	44.0	"	"	
	11	46.0	103.6	"	
	13	48.0	"	"	
	15	50.0	"	"	
	17	52.0	"	"	
	19	54.0	"	"	
138-41, 143	2	38.8	98.4	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.5	"	
	5	44.0	"	"	
	6	46.0	103.6	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
142	7	37.8	98.4	- 8.0	5
	8	"	"	"	
	9	40.2	"	"	
	10	42.0	100.5	"	
	11	44.0	"	"	
	12	46.0	103.6	"	
	13	48.0	"	"	
	14	50.0	"	"	
	15	52.0	"	"	
	16	54.0	"	"	
	17	56.8	"	"	

TABLE 3 (CONTINUED)
INDEX TO RAKE POSITIONS

RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
149-151	2	38.8	98.5	- 8.0	5
	3	40.0	"	"	
	4	42.0	100.6	"	
	5	44.0	"	"	
	6	46.0	103.5	"	
	7	48.0	"	"	
	8	50.0	"	"	
	9	52.0	"	"	
	10	54.0	"	"	
152-6, 158	2	42.9	97.9	0.0	6
161-4, 166	3	44.9	"	"	
167, 169-71	4	46.9	100.6	"	
175, 177-9	5	48.9	"	"	
180, 182, 184	6	50.9	104.6	"	
186-8, 190	7	52.9	"	"	
191, 193, 194	8	54.9	"	"	
196, 198, 201	9	56.9	"	"	
204, 207, 208					
211					
159	1	54.9	104.6	0.0	6
	2	52.9	"	"	
	3	50.7	"	"	
	4	48.6	100.6	"	
	5	46.7	"	"	
160, 203	5	42.9	97.9	0.0	6
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
	11	54.9	"	"	
165	3	44.9	97.9	0.0	6
	4	42.9	"	"	
	5	46.9	100.6	"	
	6	48.9	"	"	
	7	50.9	104.6	"	
	8	52.9	"	"	

TABLE 3 (CONTINUED)					
INDEX TO RAKE POSITIONS					
RUN NUMBER	TEST POINT	WATER LINE	MODEL STATION	BUTT LINE	LOCATION FIGURE
168, 183	4	42.9	97.9	0.0	6
	5	44.9	"	"	
	6	46.9	100.6	"	
	7	48.9	"	"	
	8	50.9	104.6	"	
	9	52.9	"	"	
	10	54.9	"	"	
172	3	42.9	97.9	0.0	6
	4	44.9	"	"	
	6	44.9	"	"	
	7	46.9	100.6	"	
	8	48.9	"	"	
	9	50.9	104.6	"	
	10	52.9	"	"	
173, 174, 176 185, 195, 197 199, 200, 205 210	1	42.9	97.9	0.0	6
	2	44.9	"	"	
	3	46.9	100.6	"	
	4	48.9	"	"	
	5	50.9	104.6	"	
	6	52.9	"	"	
	7	54.9	"	"	
181	2	42.9	97.9	0.0	6
	3	44.9	"	"	
	4	46.9	100.6	"	
	5	48.9	"	"	
	6	50.9	104.6	"	
	7	52.9	"	"	
	9	54.9	"	"	
	10	"	"	"	
	11	"	"	"	
	12	"	"	"	
	13	42.9	97.9	"	

[illegible]

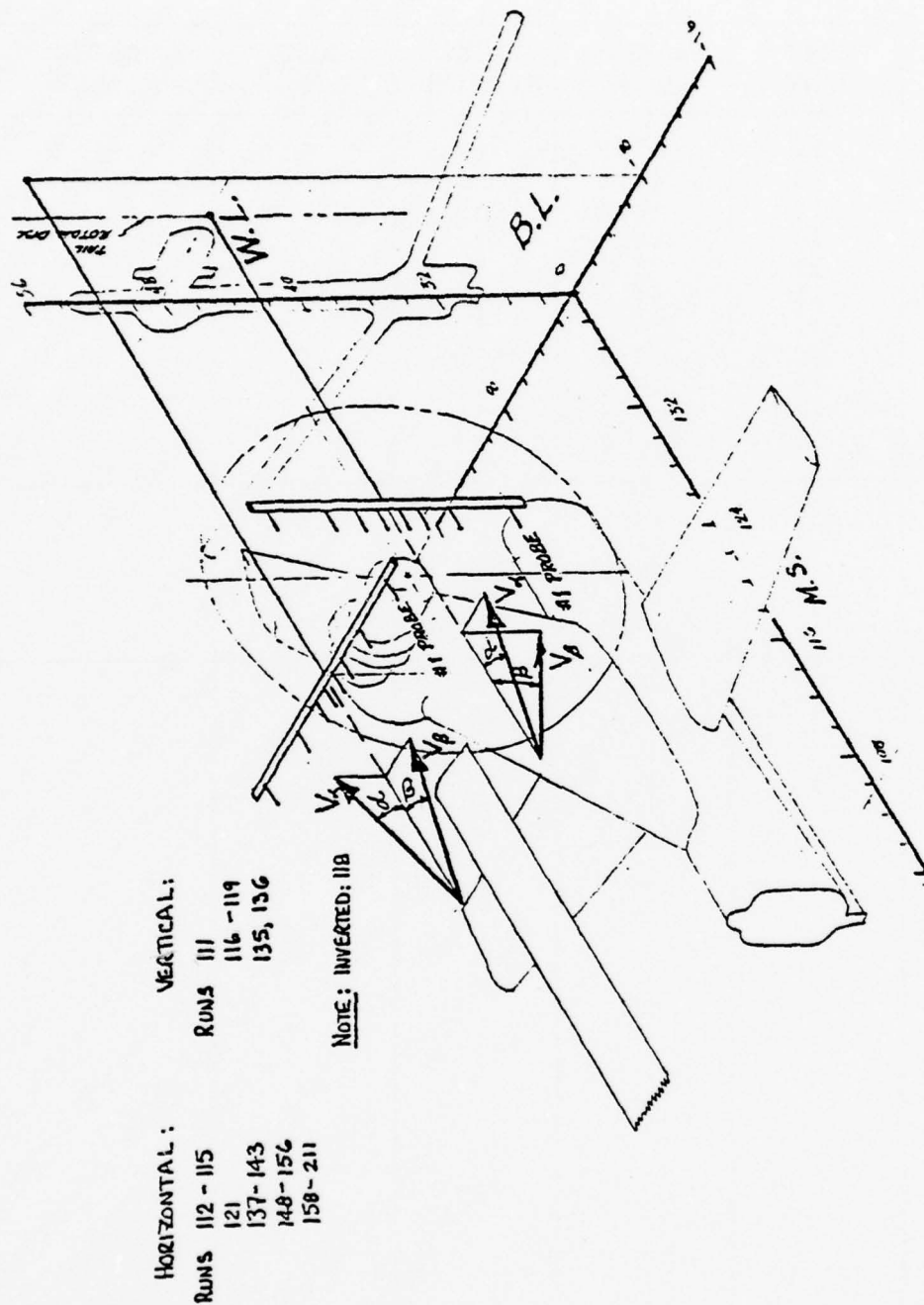


FIGURE 1 - RAKE ORIENTATION DIAGRAM

RUN 121

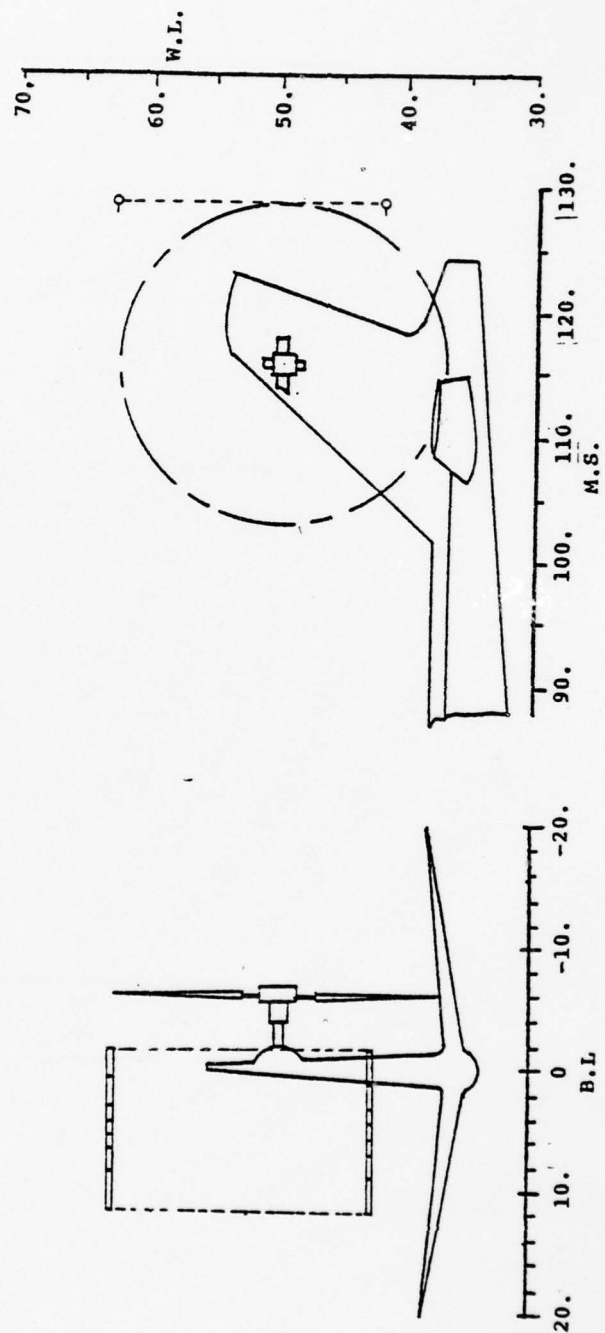


FIGURE 2 -HOT FILM RAKE LOCATIONS

RUN 135

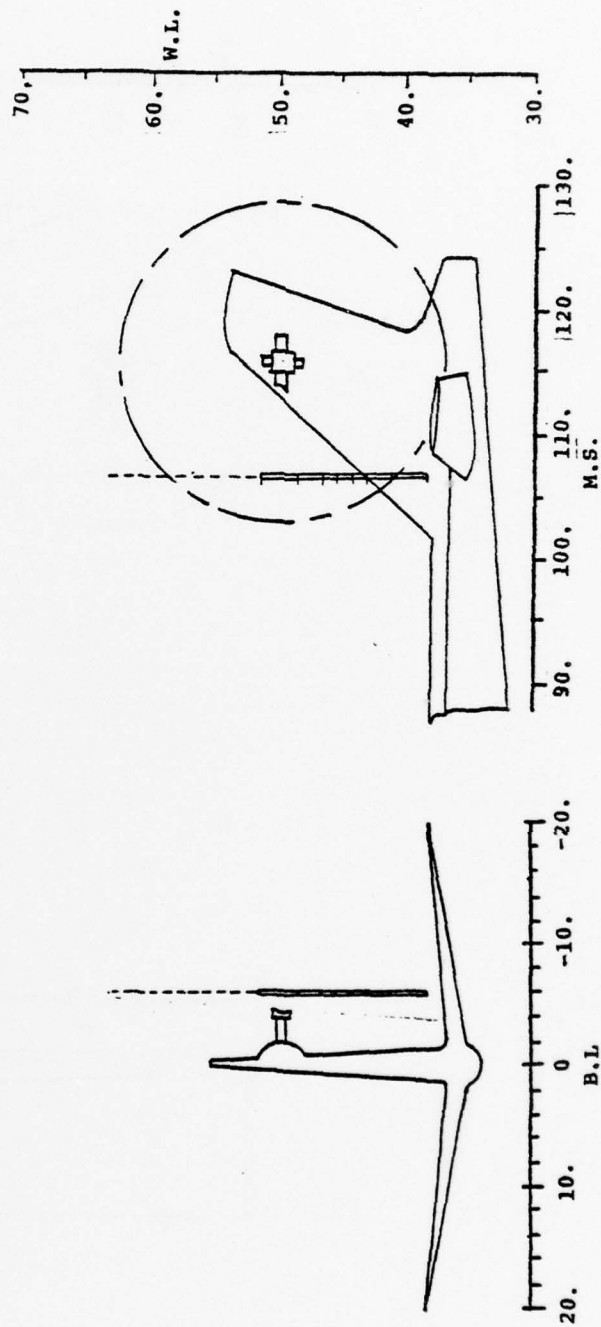


FIGURE 3 -HOT FILM RAKE LOCATIONS

RUN 136

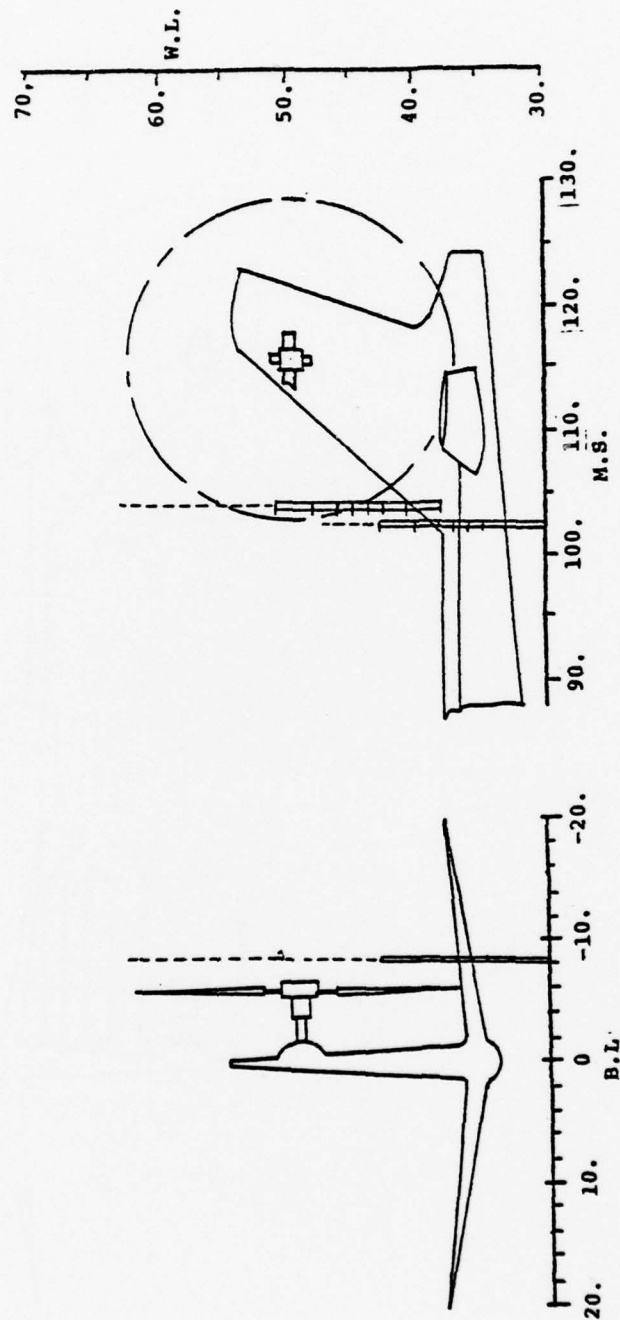


FIGURE 4 -HOT FILM RAKE LOCATIONS

RUN 137, 138, 139, 140, 141, 142,
143, 148, 149, 150, 151

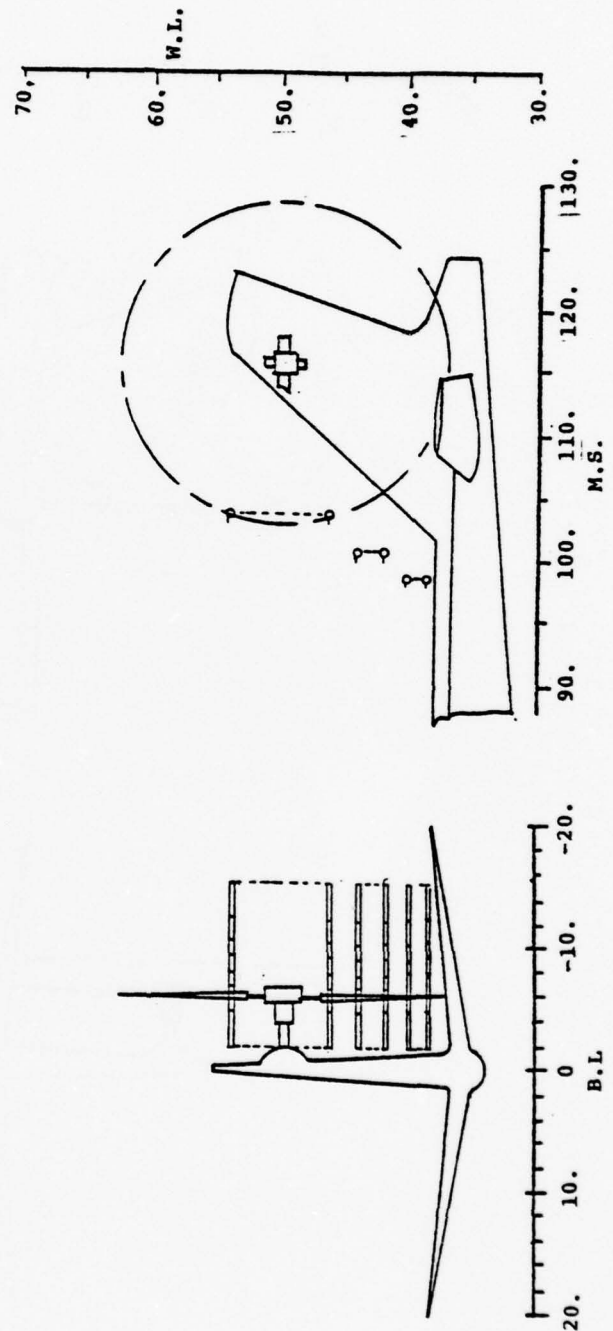


FIGURE 5 -HOT FILM RAKE LOCATIONS

RUN 152-156, 158-211

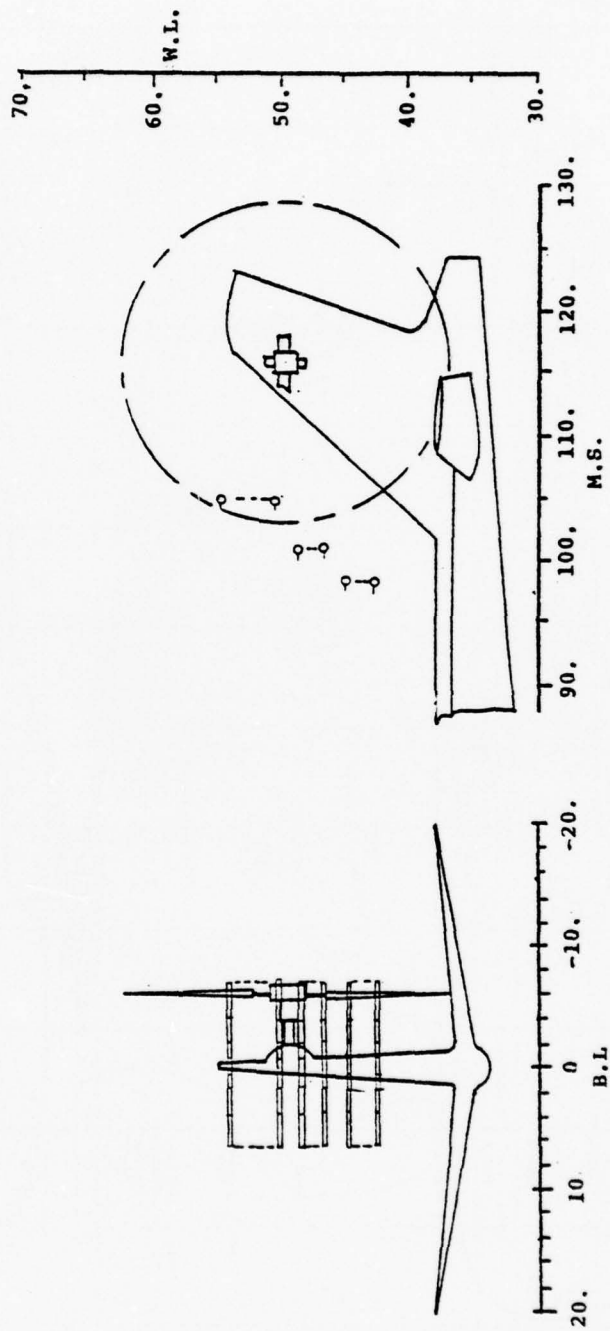
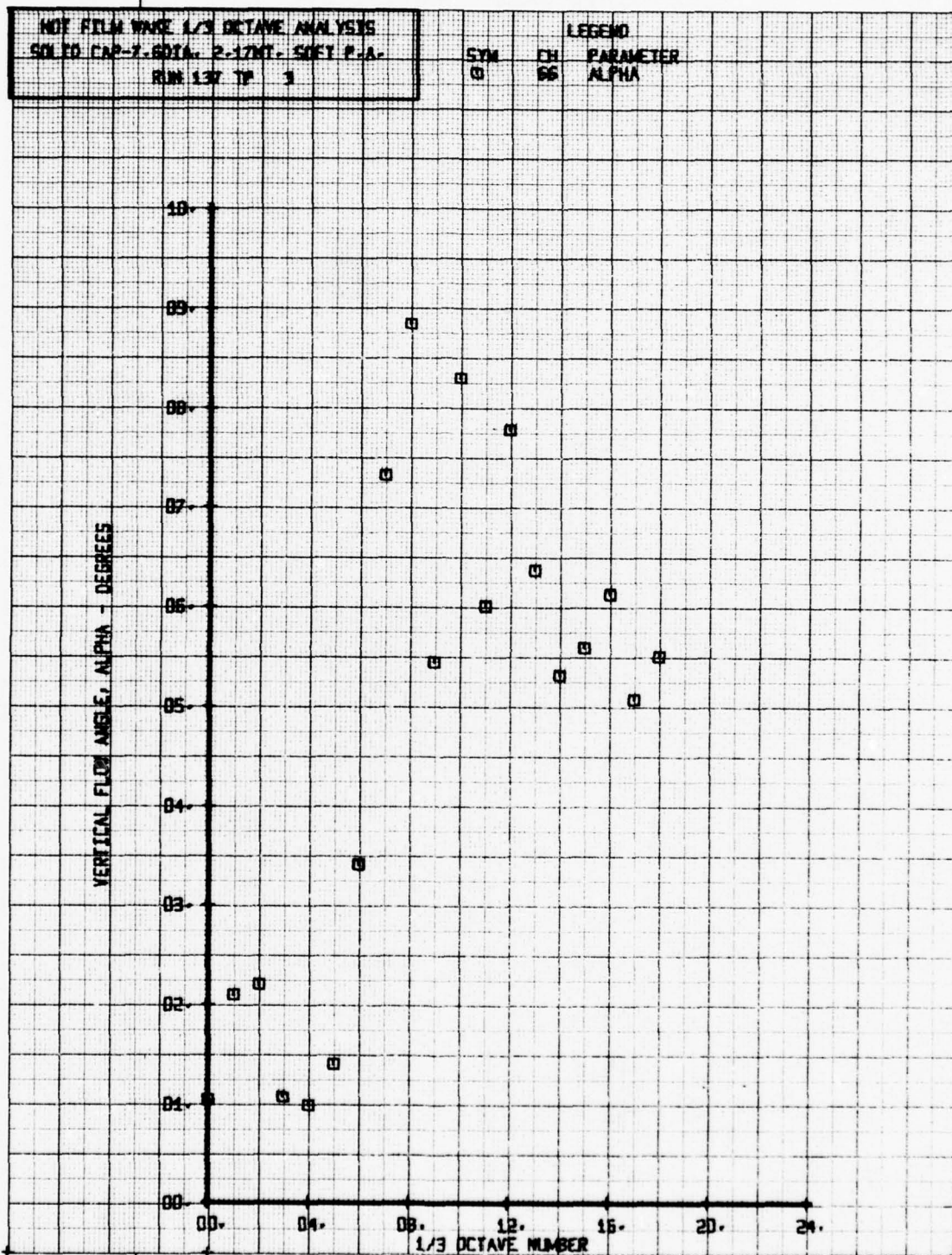


FIGURE 6 -HOT FILM RAKE LOCATIONS

TABLE 4
1/3 OCTAVE BAND IDENTIFICATION

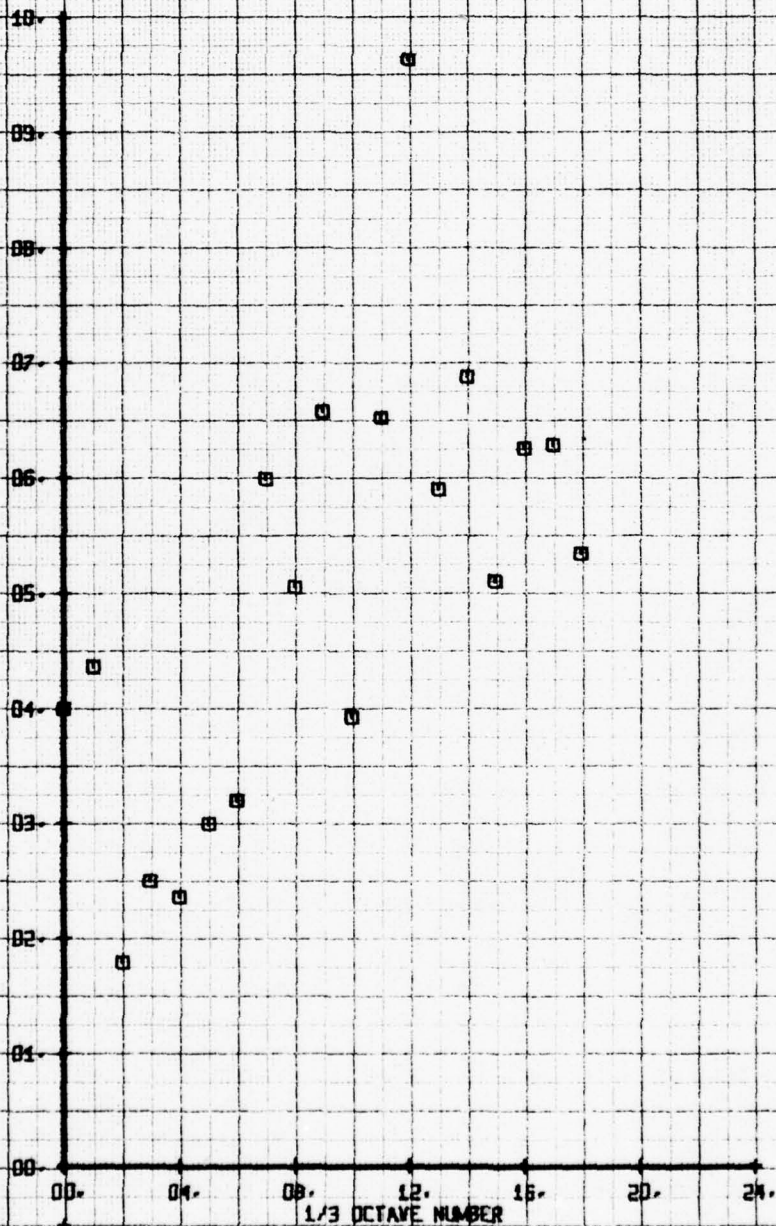
BAND NUMBER	BAND WIDTH - Hz		
	MINIMUM	CENTER	MAXIMUM
0	3.5	3.4	4.4
1	4.4	4.9	5.5
2	5.5	6.2	7.0
3	7.0	7.8	8.7
4	8.7	9.8	11.0
5	11.0	12.4	13.9
6	13.4	15.6	17.5
7	17.5	19.7	22.1
8	22.1	24.8	27.8
9	27.8	31.25	35.1
10	35.1	39.4	44.2
11	44.2	49.6	55.7
12	55.7	62.5	70.2
13	70.2	78.7	88.9
14	88.9	99.2	111.4
15	111.4	125.0	140.3
16	140.3	157.5	176.8
17	176.8	198.4	222.7
18	222.7	250.0	280.6



NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 S01 TO CAP-7.6DIA. 2.17MT. SEFT P-A.
 RUN 137 TP 5

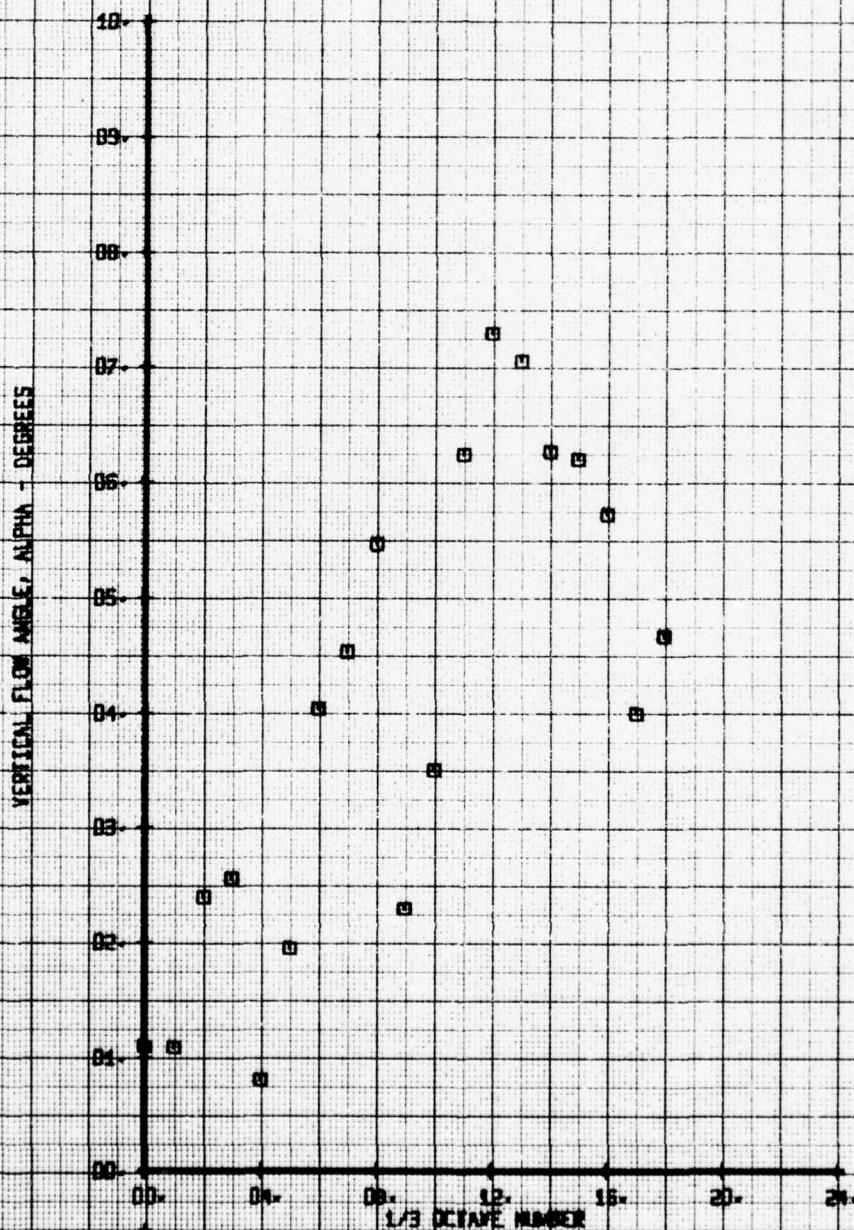
LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



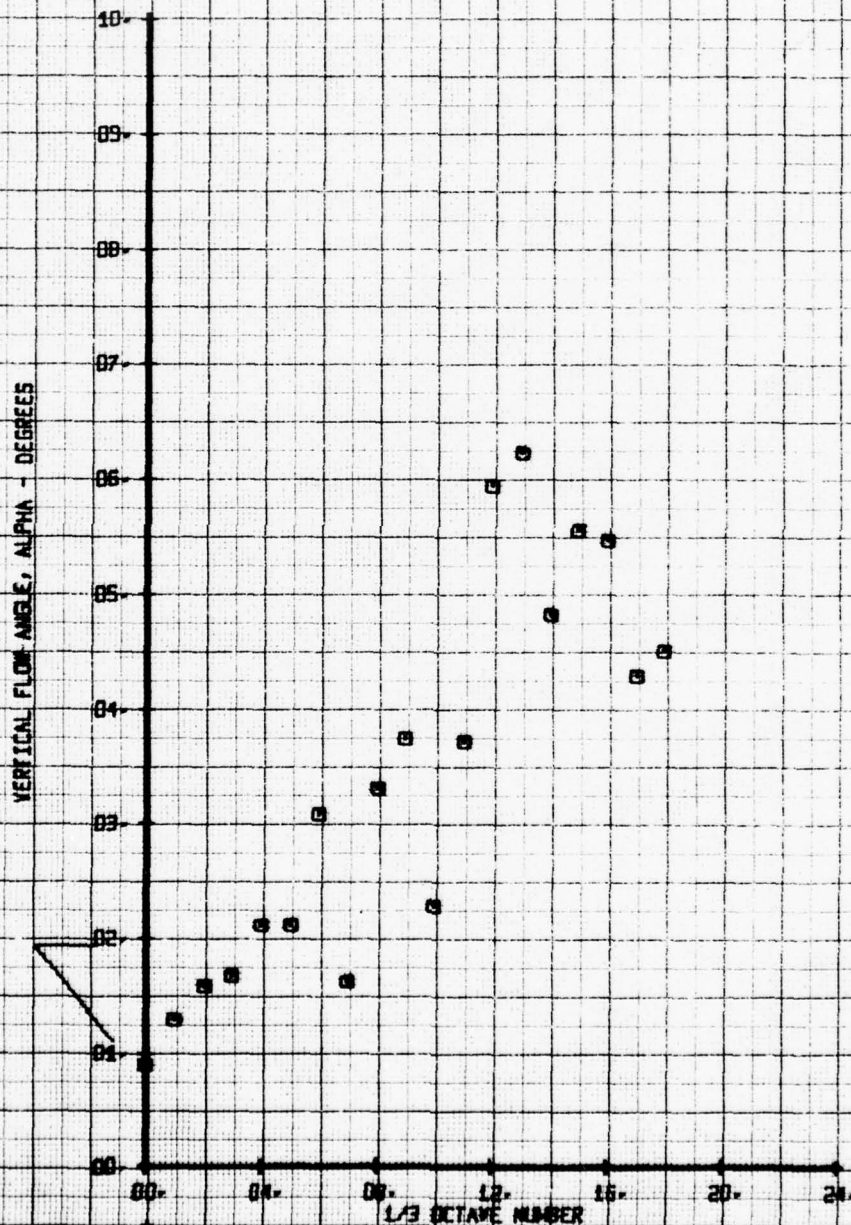
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17MT. SOFT P.A.
 RUN 137 TP 7

SYM	CH	PARAMETER
0	56	ALPHA



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17MT. SOFT P.A.
 RUN 137 TP 9

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



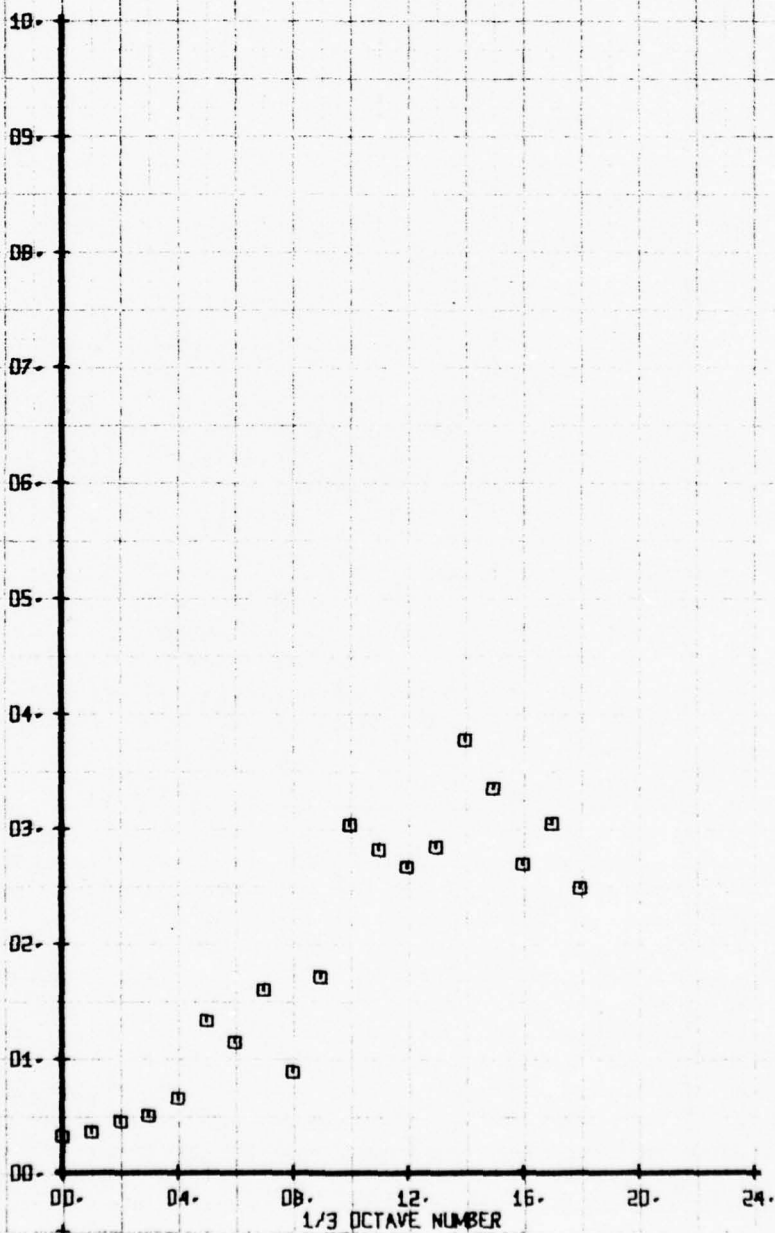
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17MT. SOFT P-A.
 RUN 137 TP 11

SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

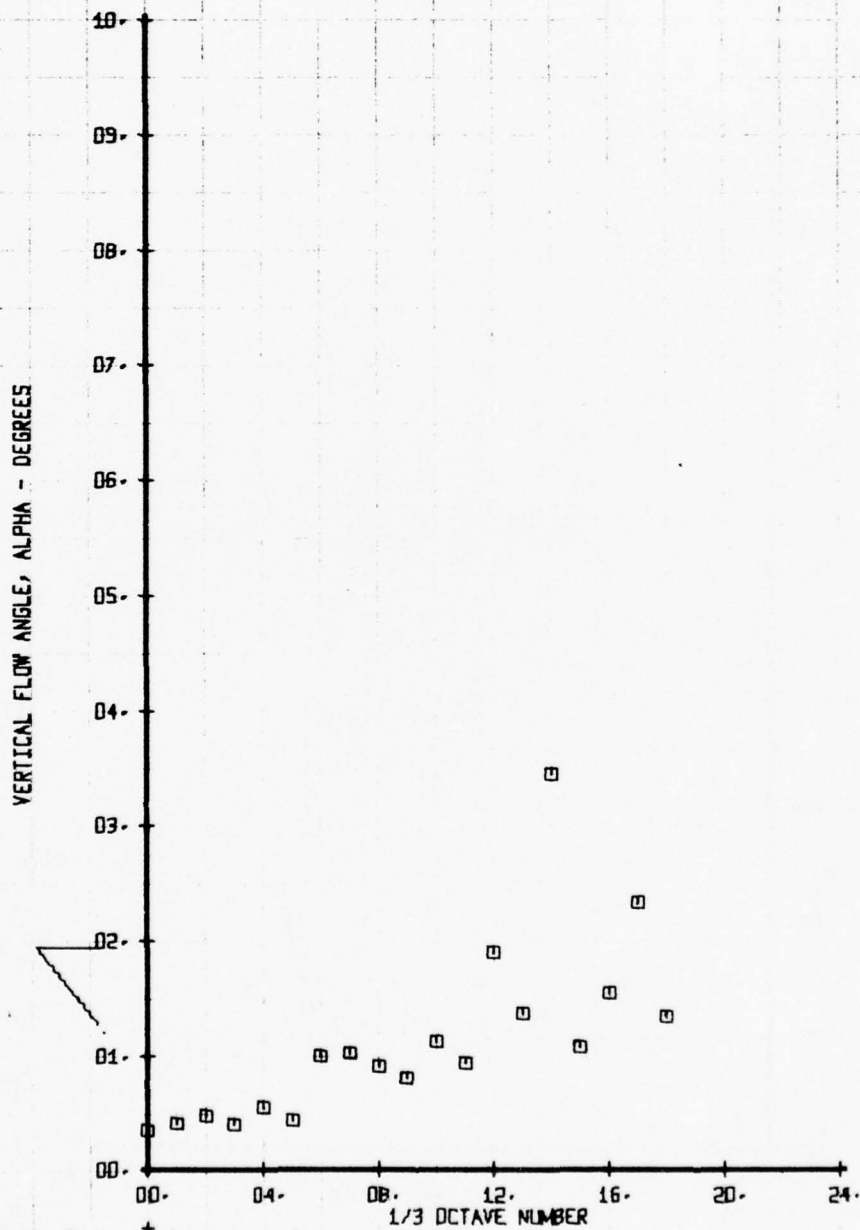


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P.A.
 RUN 137 TP 13

SYM
 □

CH
 66

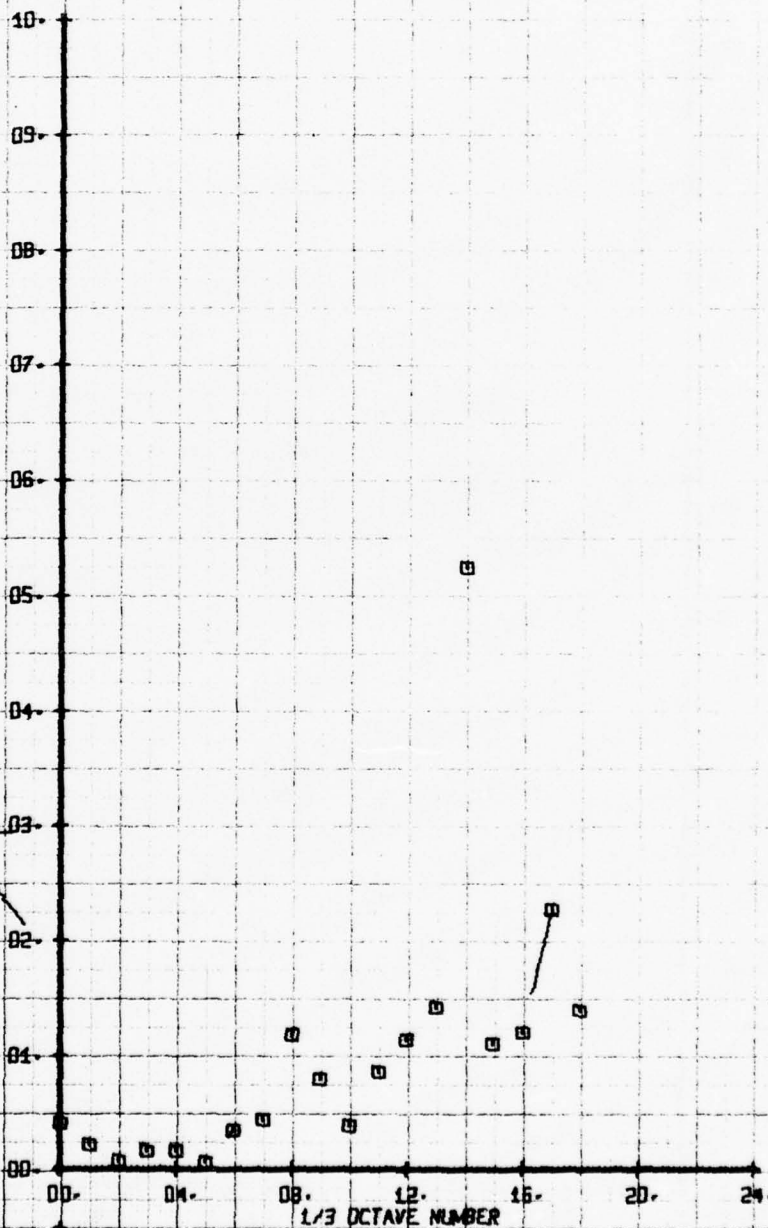
LEGEND
 PARAMETER
 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P-A.
 RUN 137 TP 15

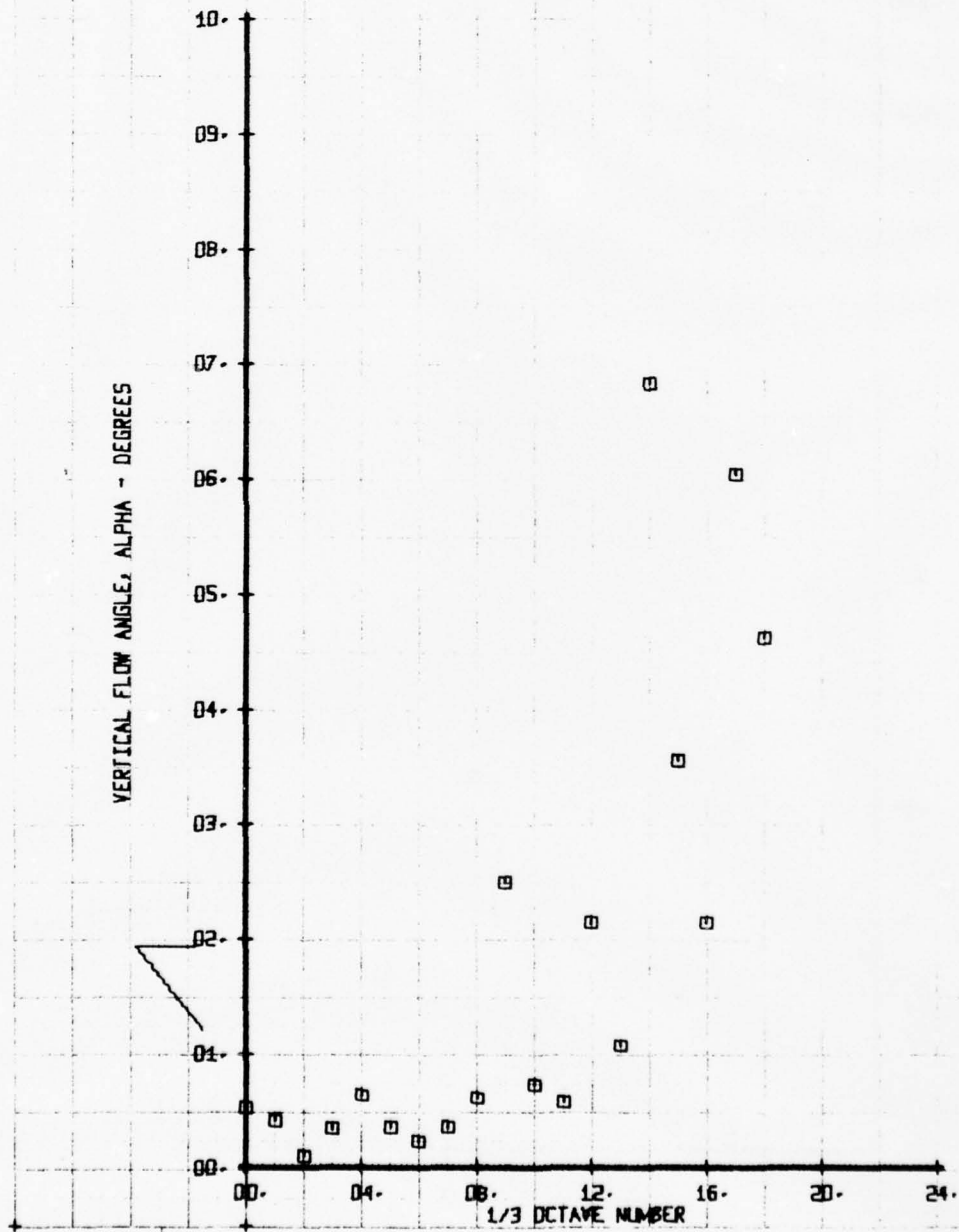
SYN CH PARAMETER
 0 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P-A.
 RUN 137 TP 17

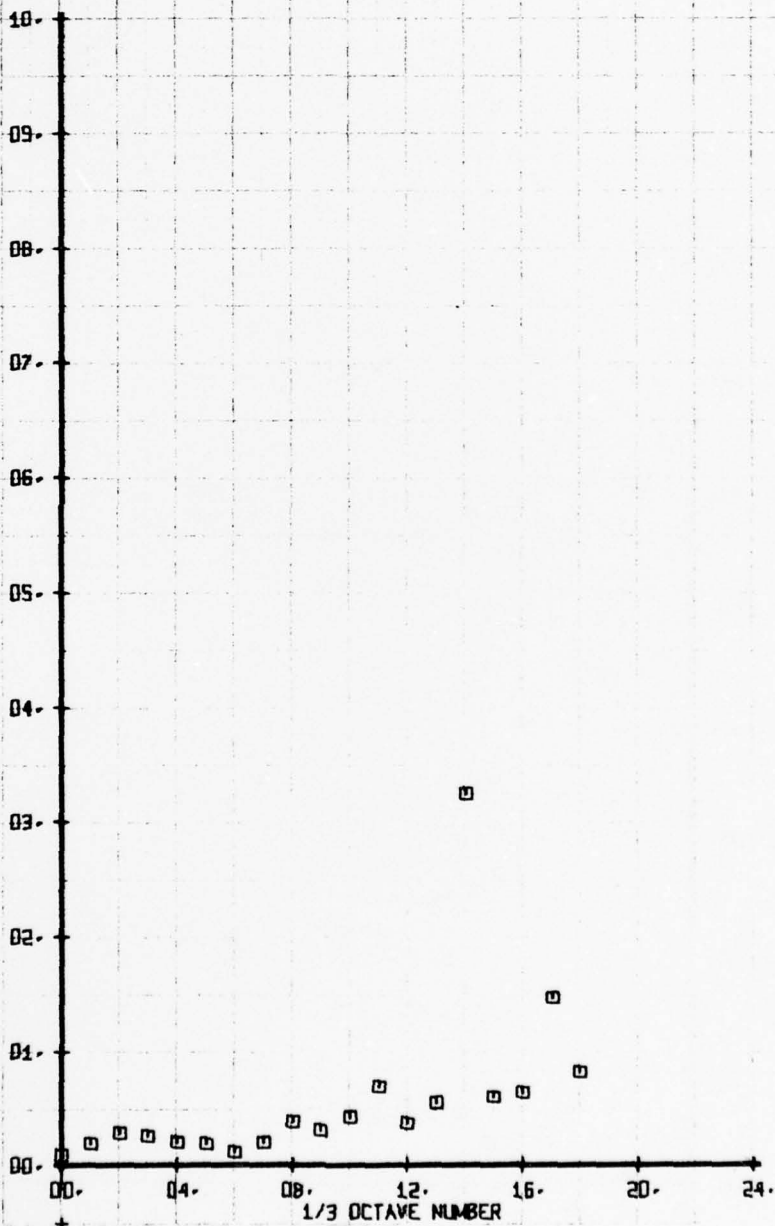
LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



MORT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.60IA-2-17HI-50FT P.A.
 RUN 137 TP 19

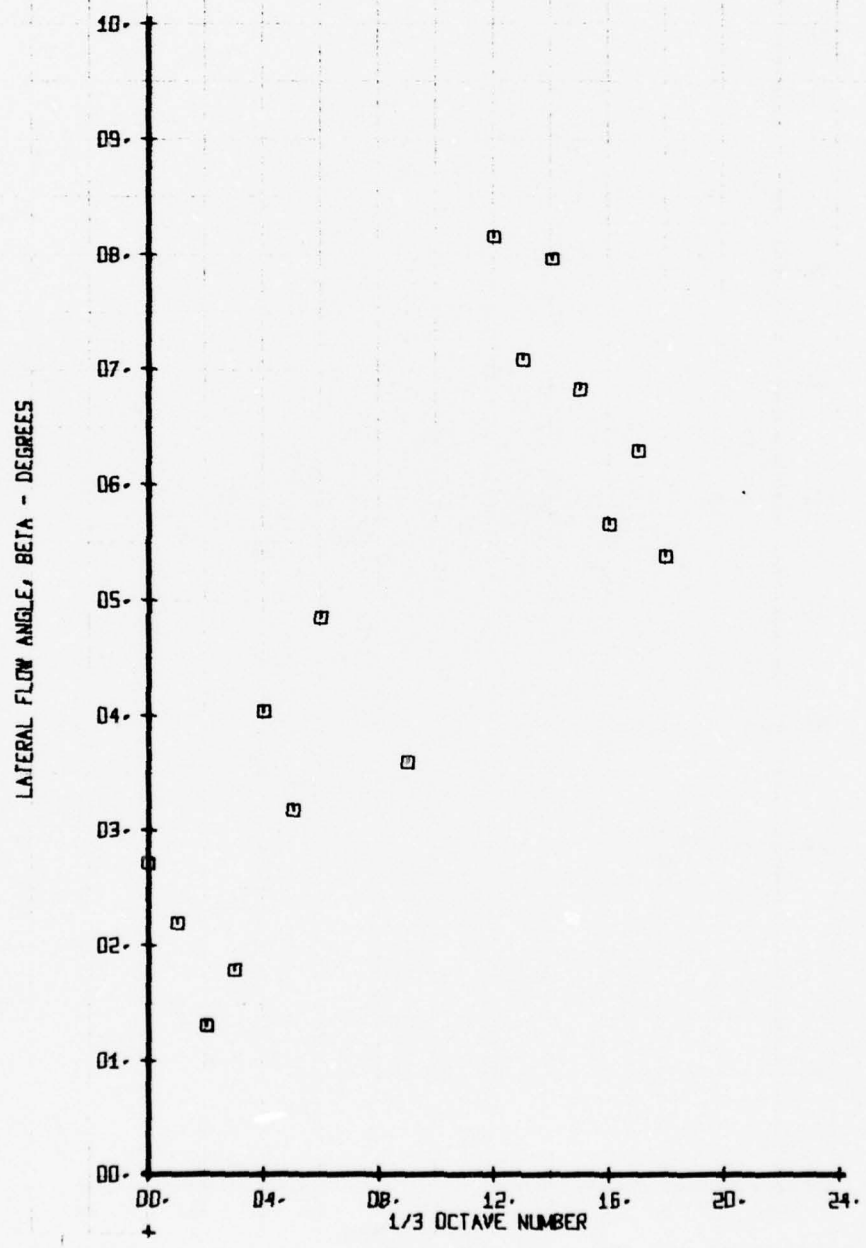
SYM	CH	PARAMETER
□	66	ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. 50FT P.A.
 RUN 137 TP 3

LEGEND
 SYM CH. PARAMETER
 □ 65 BETA



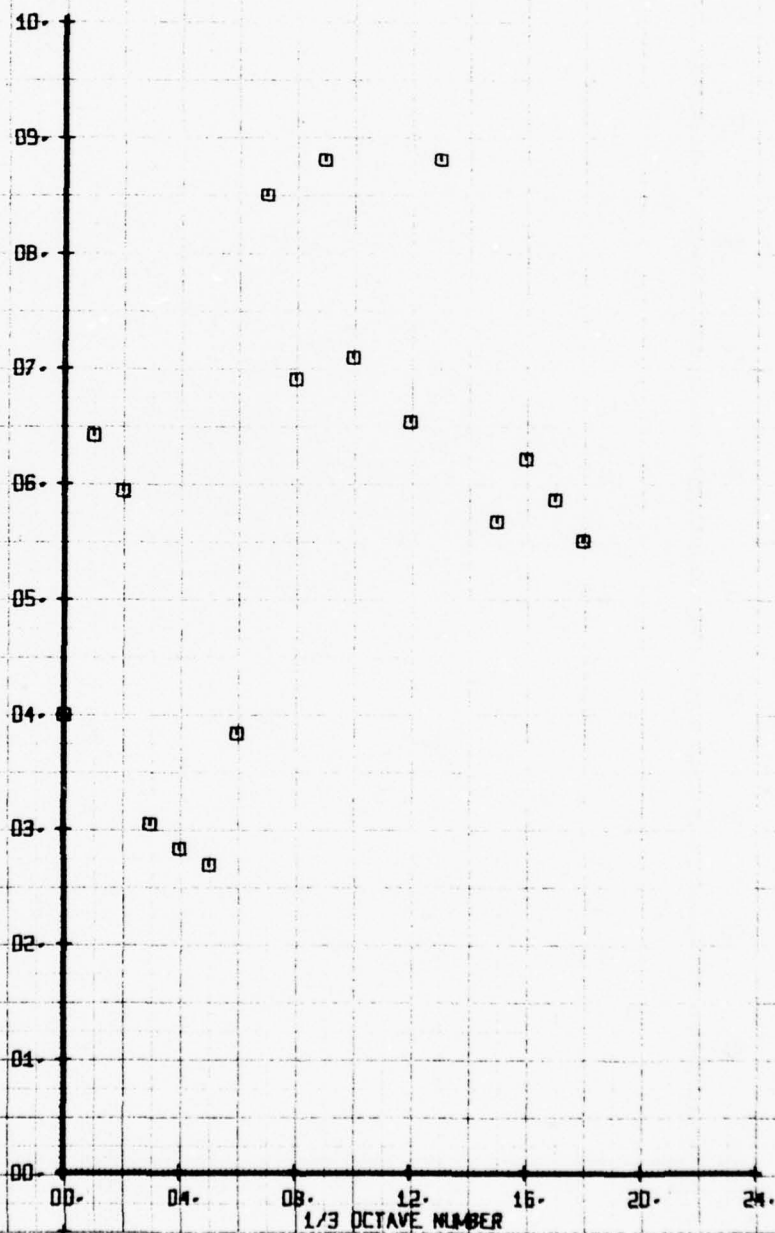
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
SOLID CAP-7.6DIA. 2.17HT. SOFT P-A.
RUN 137 TP 5

SYM
□

CH
65

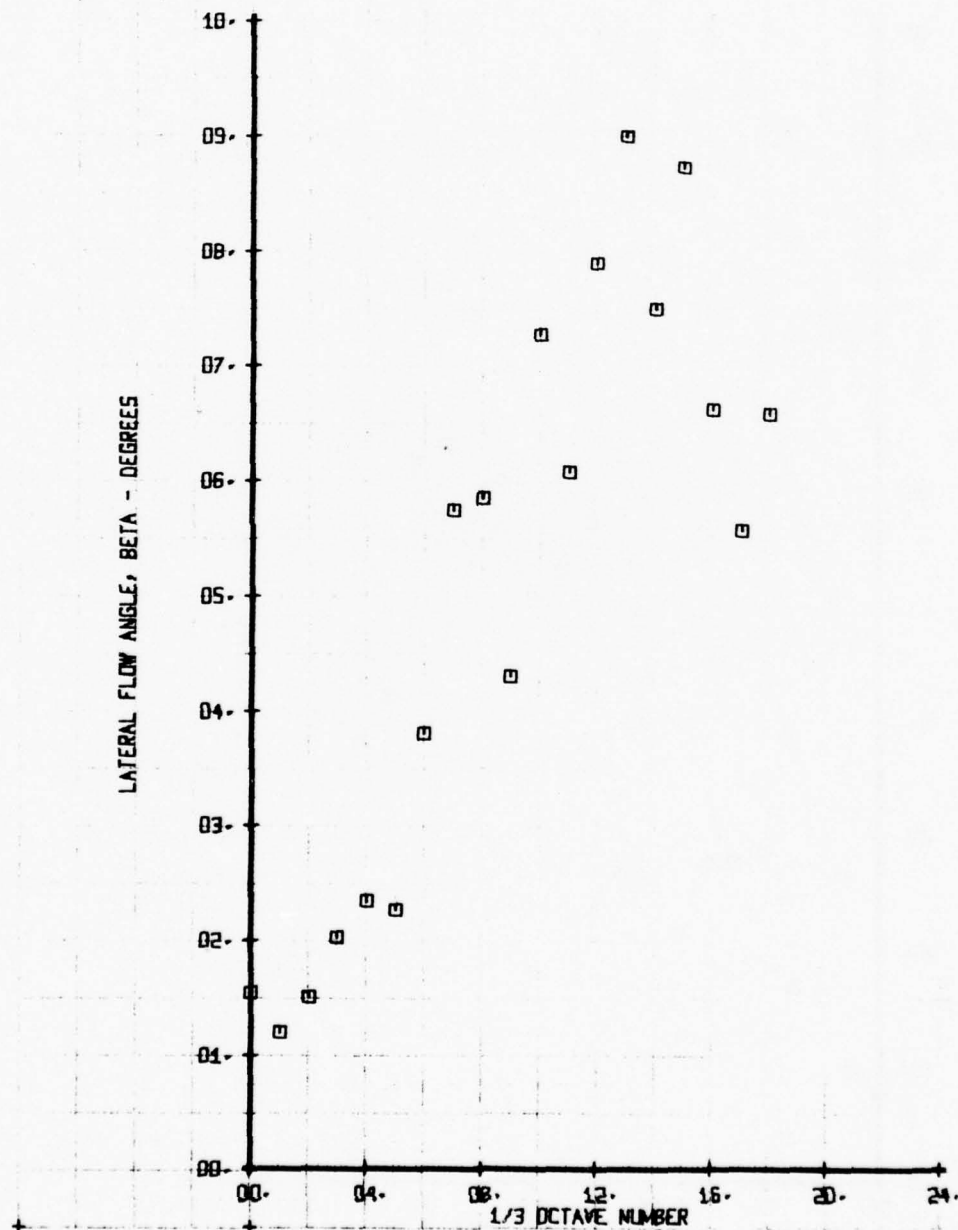
LEGEND
PARAMETER
BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-6DIA- 2-17HT- SOFT P-A-
 RUN 137 TP 7

LEGEND
 SYM CH PARAMETER
 □ 65 BETA

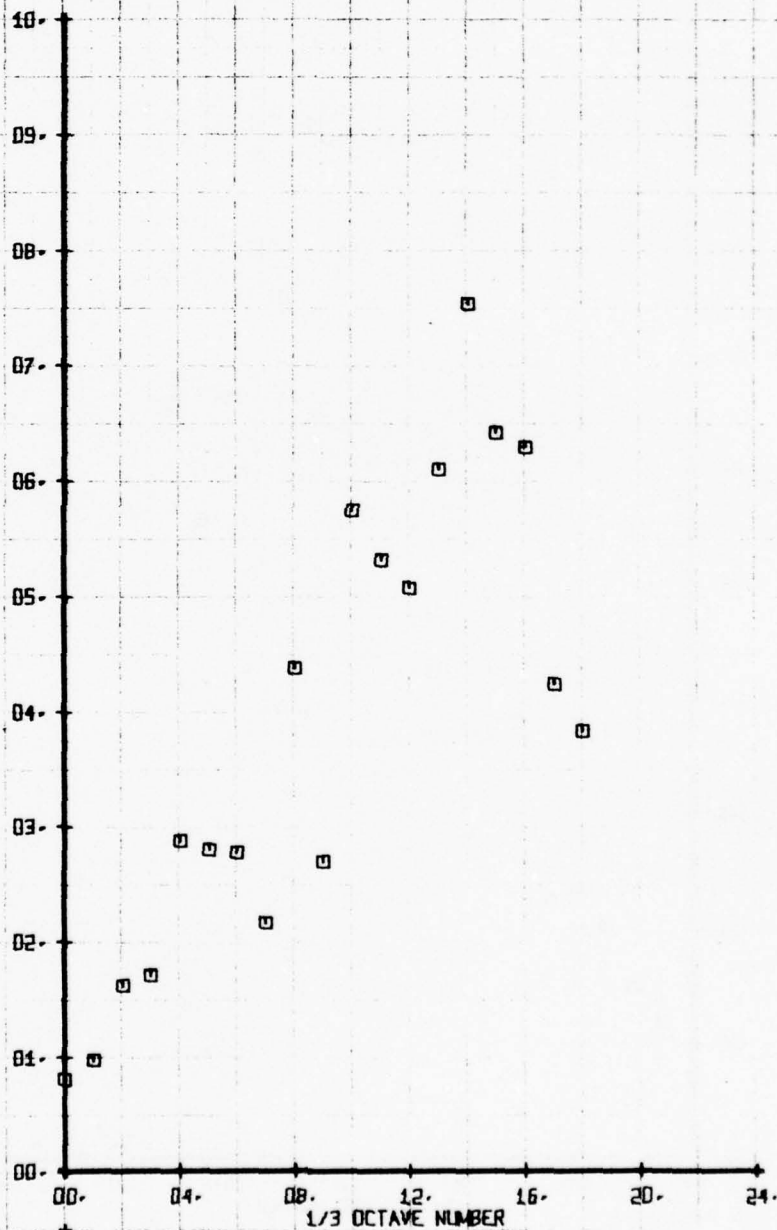


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DTA. 2-17HT. SOFT P.A.
 RUN 137 TP 9

SYM
 □

LEGEND
 CH 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

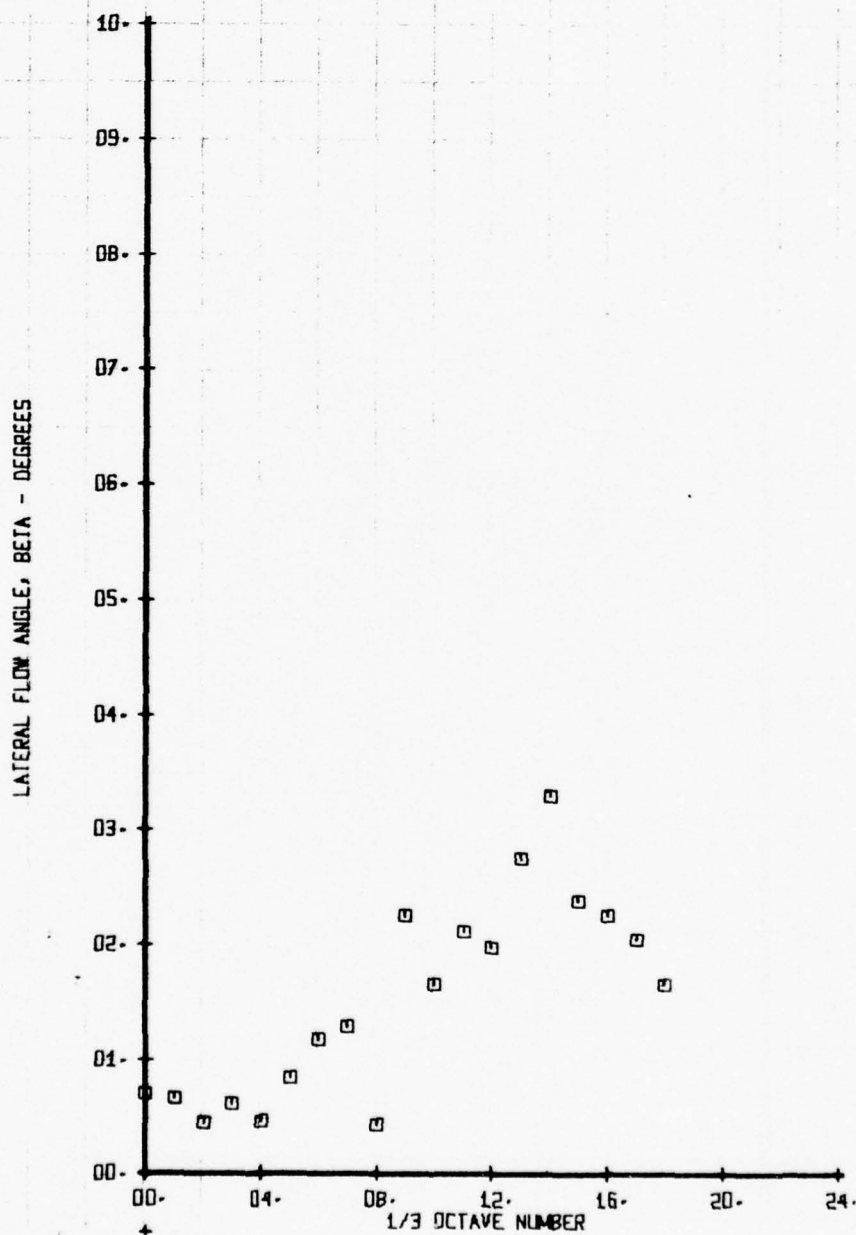


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P.A.
 RUN 137 TP 11

SYM
 □

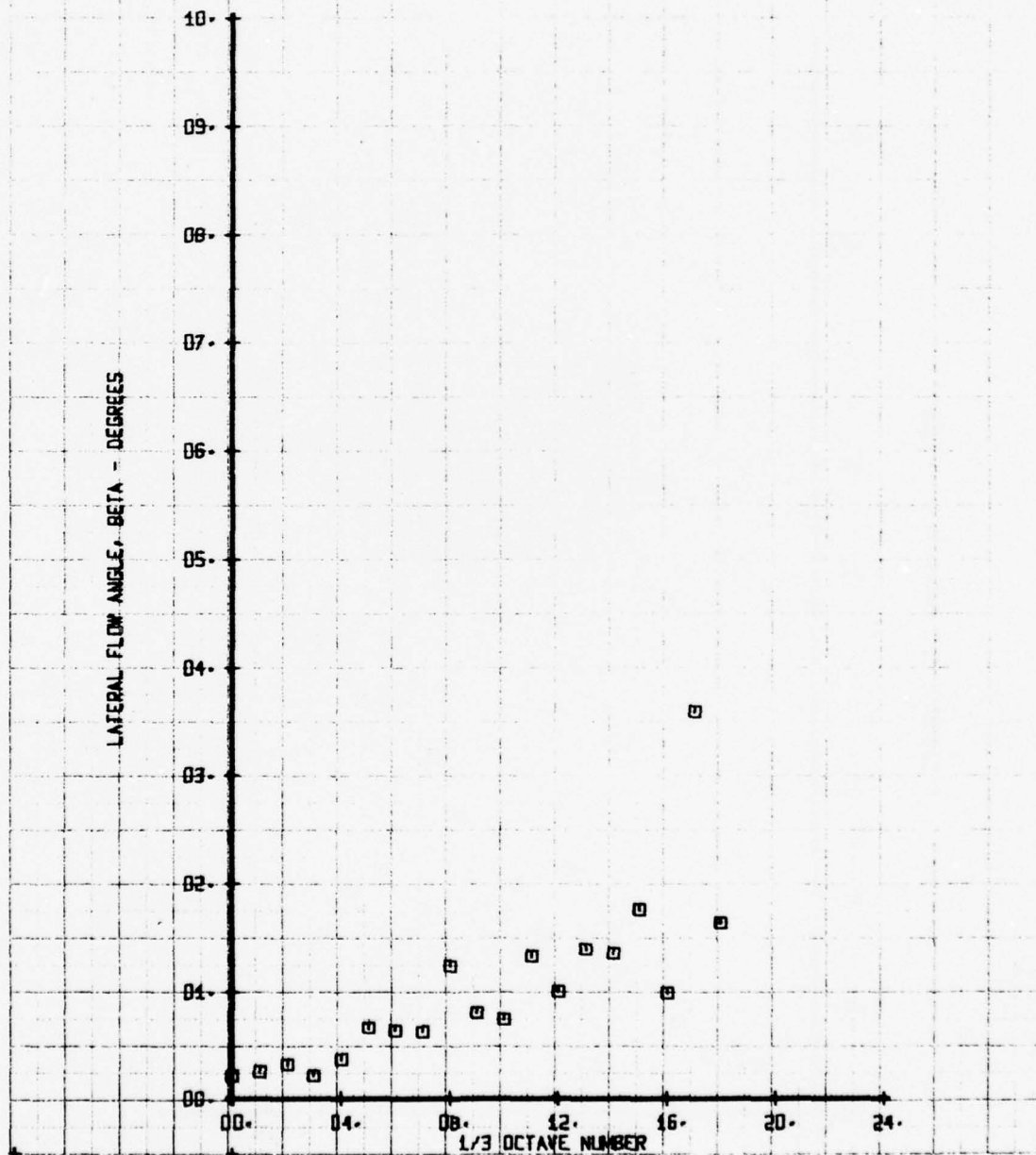
CH
 65

LEGEND
 PARAMETER
 BETA



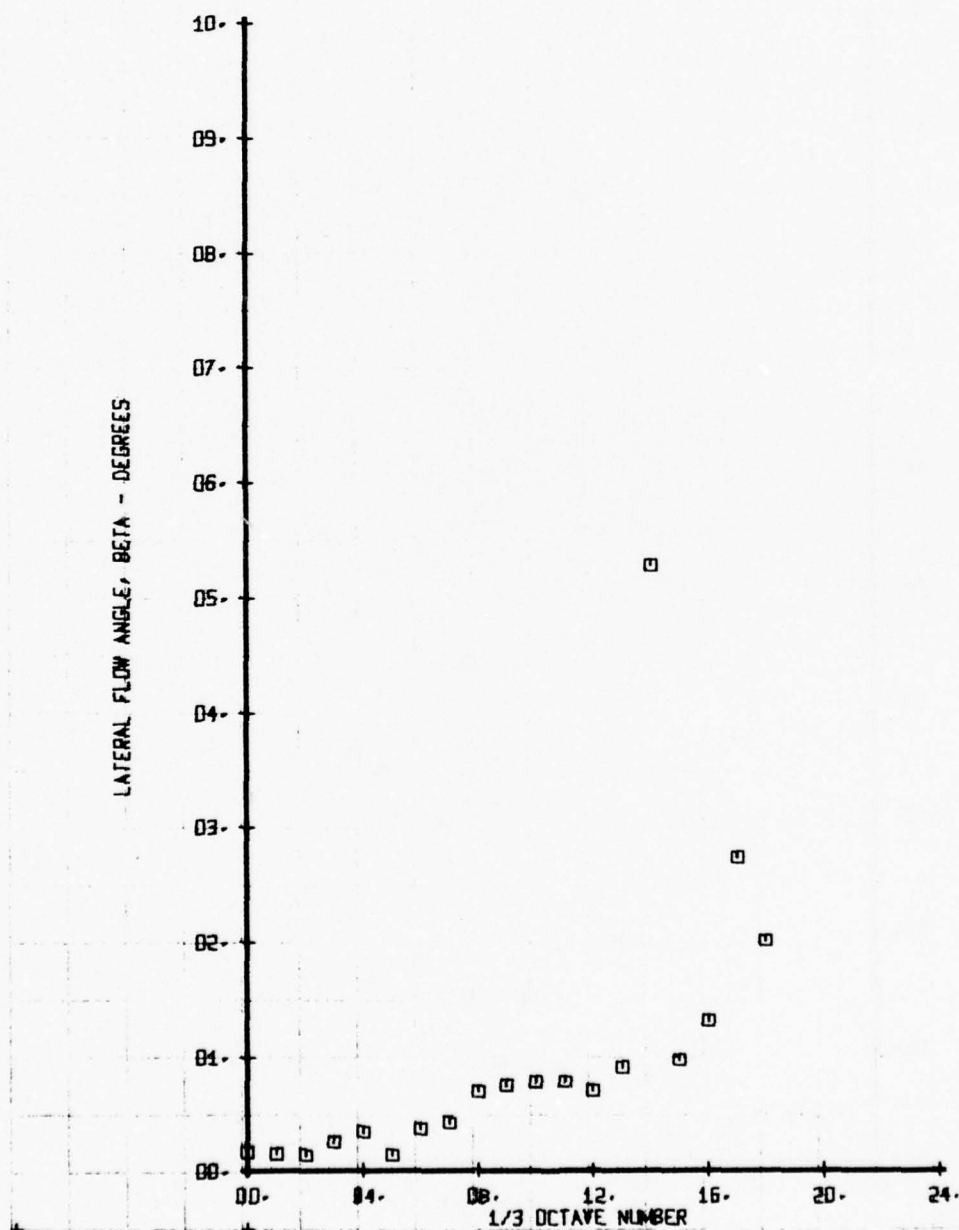
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17MT. SOFT P-A.
 RUN 137 TP 13

LEGEND
 CH PARAMETER
 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P-A.
 RUN 137 TP 15

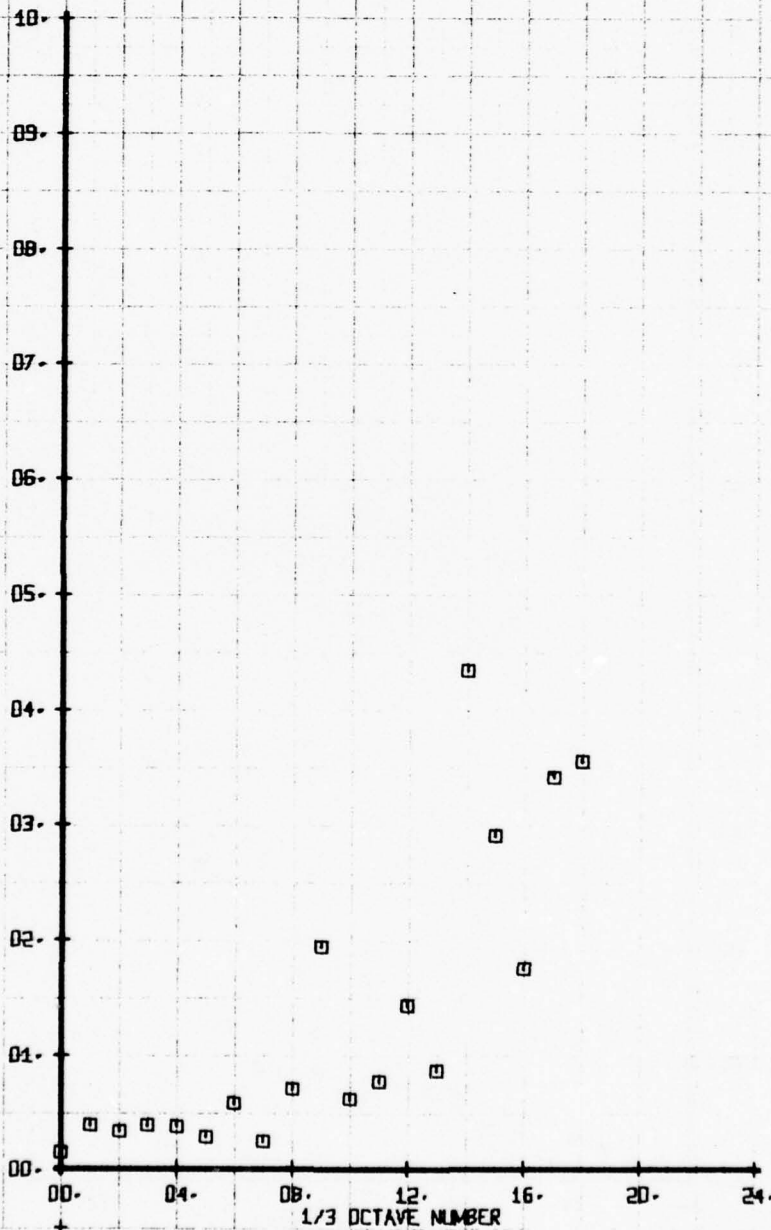
LEGEND		
SYM	CH	PARAMETER
□	65	BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DTA- 2-17HT- SOFT P.A.
 RUN 137 TP 17

SYM	CH	LEGEND
□	65	PARAMETER BETA

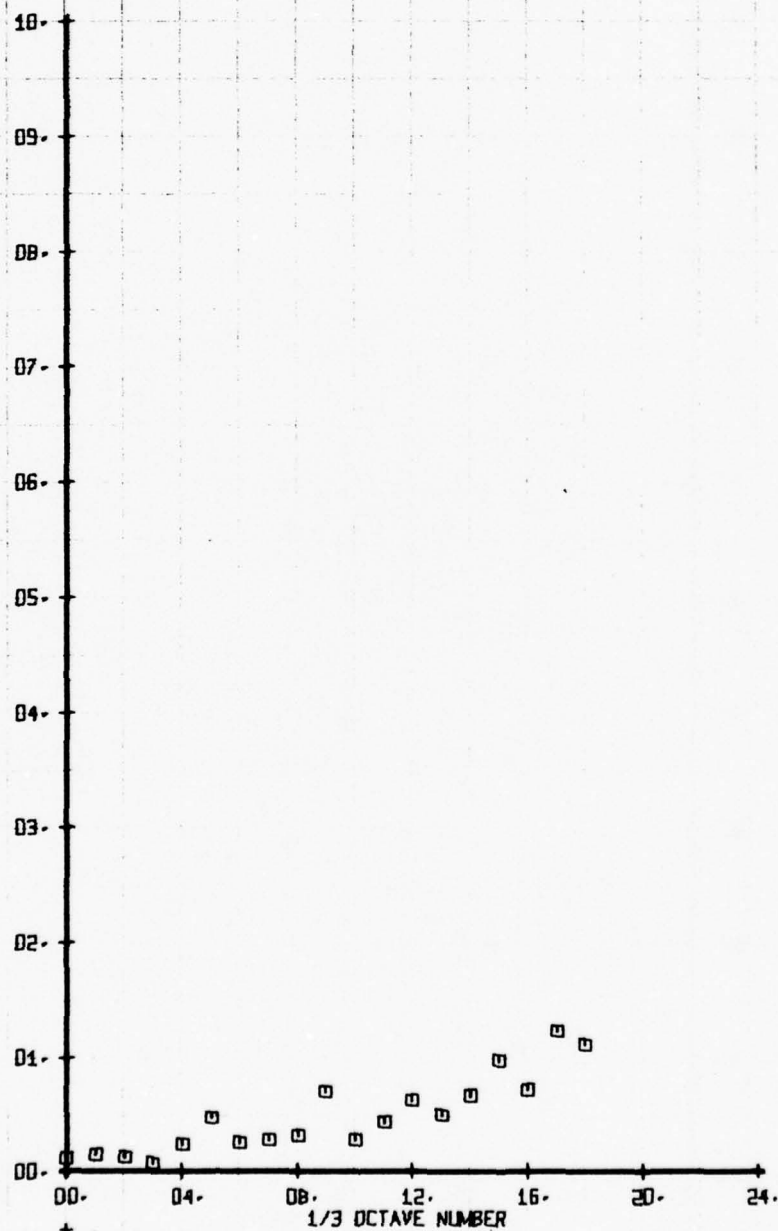
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17HT. 50FT P.A.
 RUN 137 TP 19

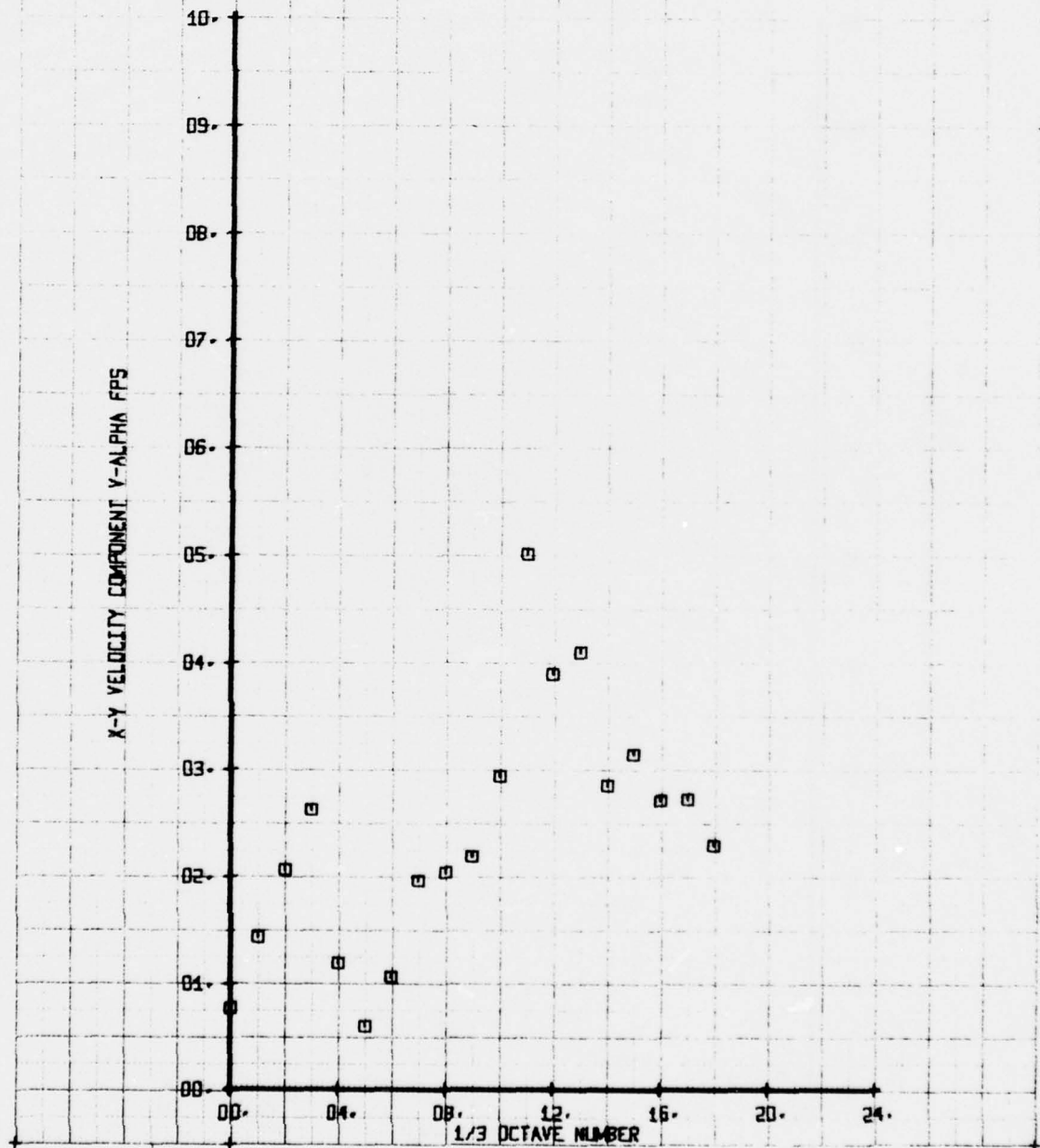
SYM	CH	LEGEND
□	65	PARAMETER BETA

LATERAL FLOW ANGLE, BETA - DEGREES



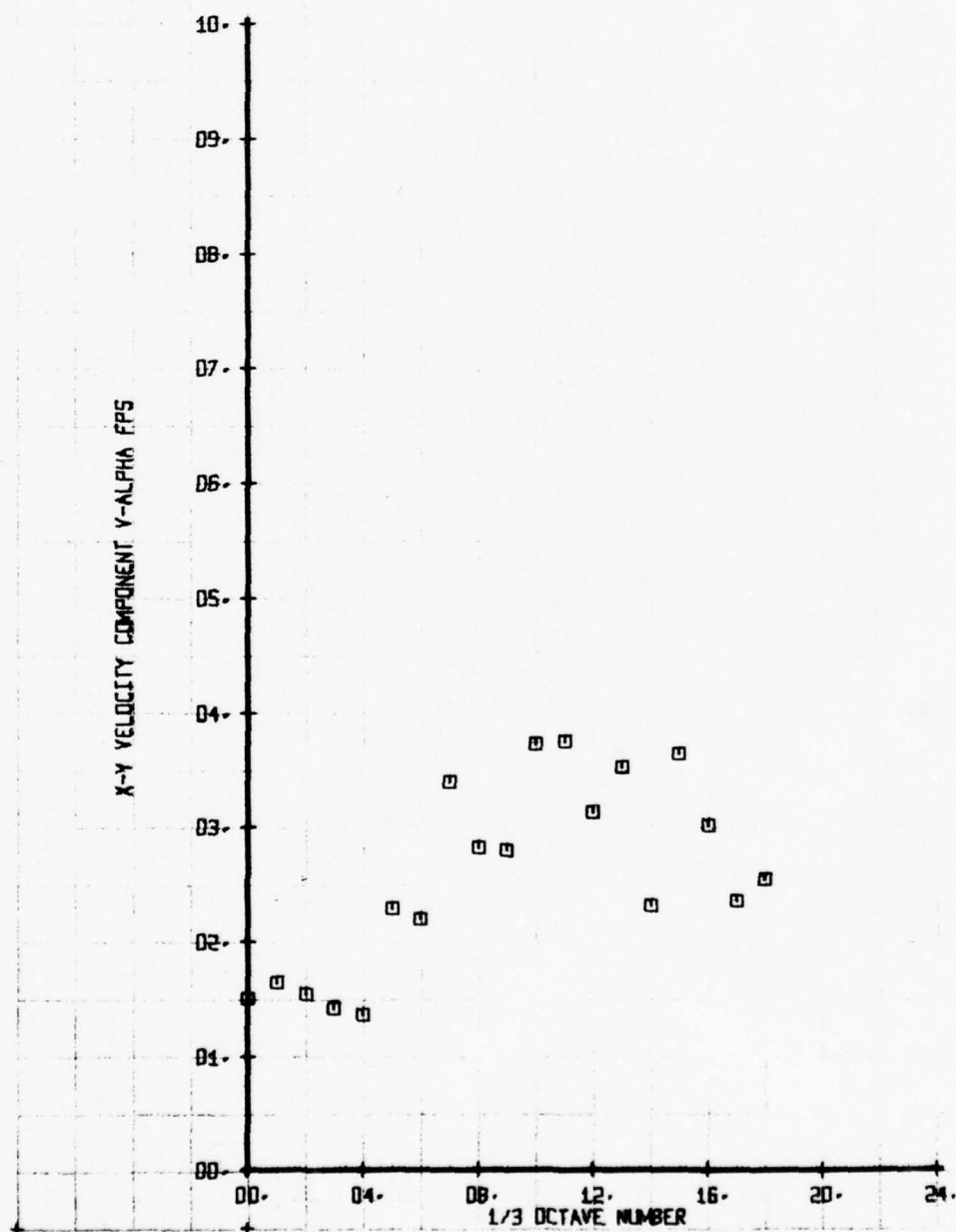
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
SOLID CAP-7.6DIA. 2.17HT. SOFT P.A.
RUN 137 TP 3

LEGEND
SYM CH PARAMETER
□ 66 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SDFT P-A.
 RUN 137 TP 5

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA



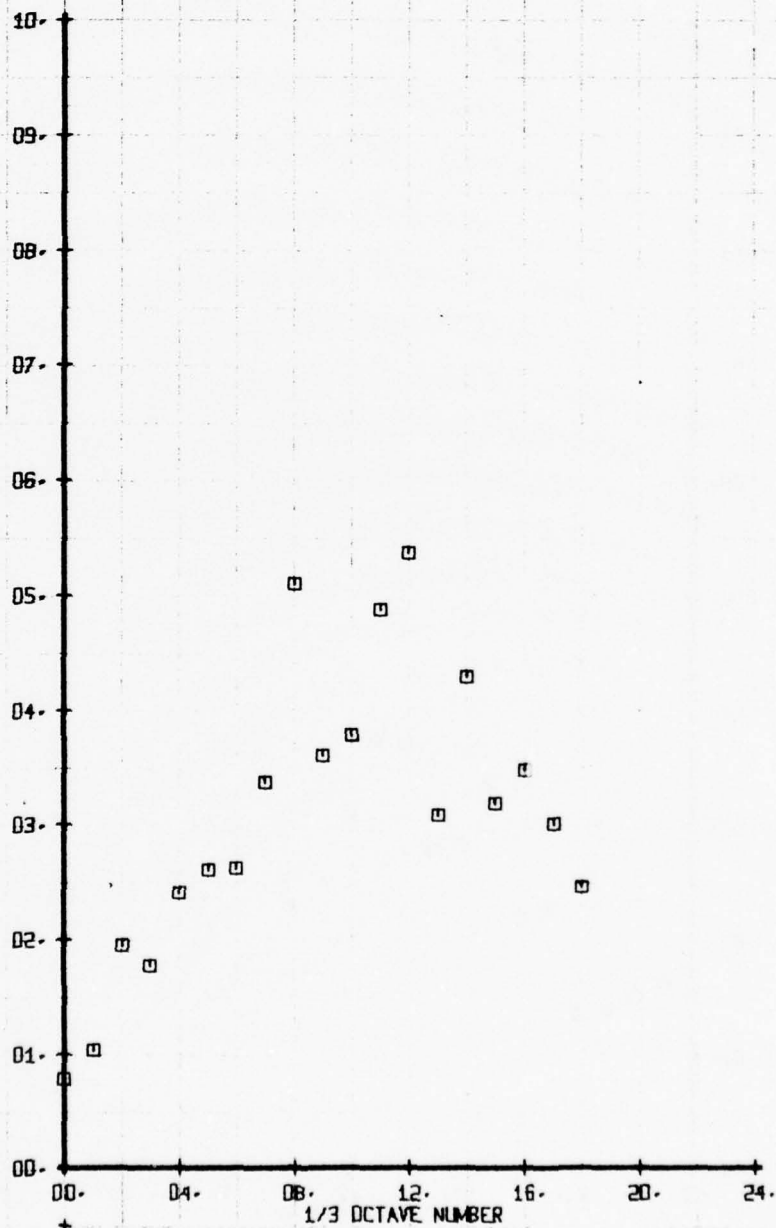
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17HT. SOFT P-A.
 RUN 137 TP 7

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



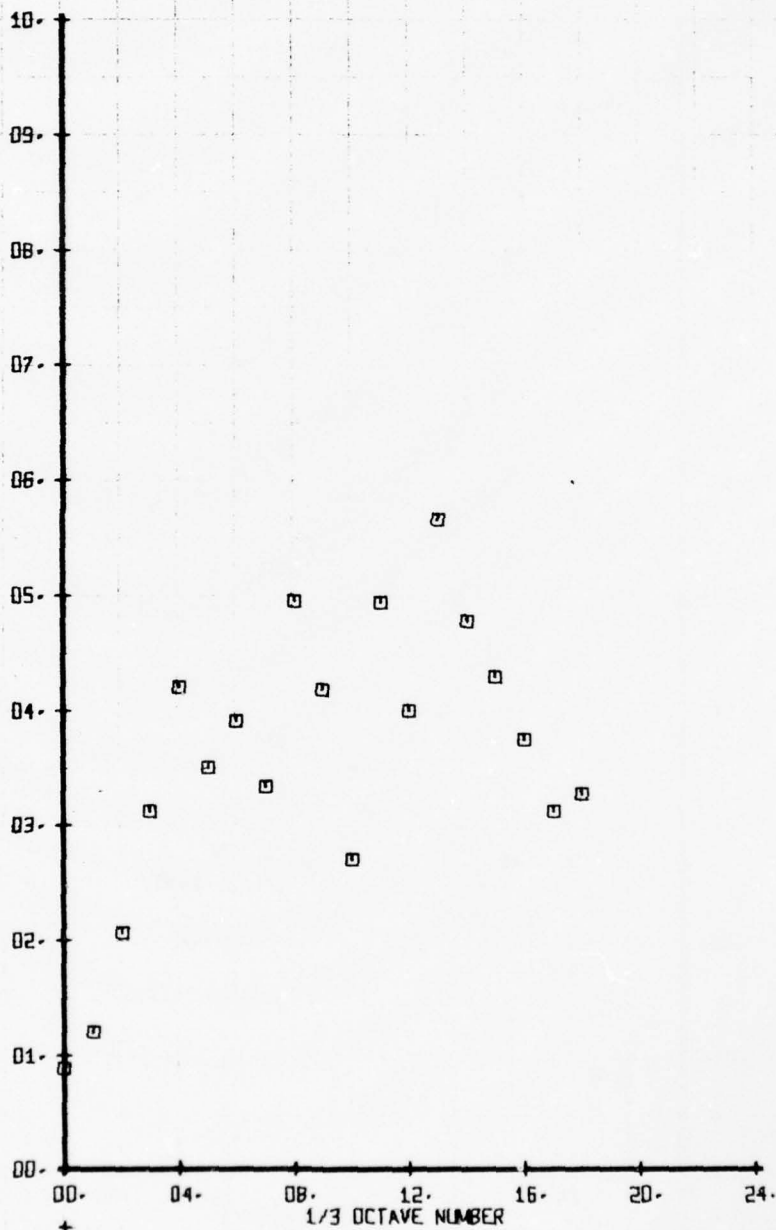
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17HT. SOFT P.A.
 RUN 137 TP 9

SYM
 □

CH
 66

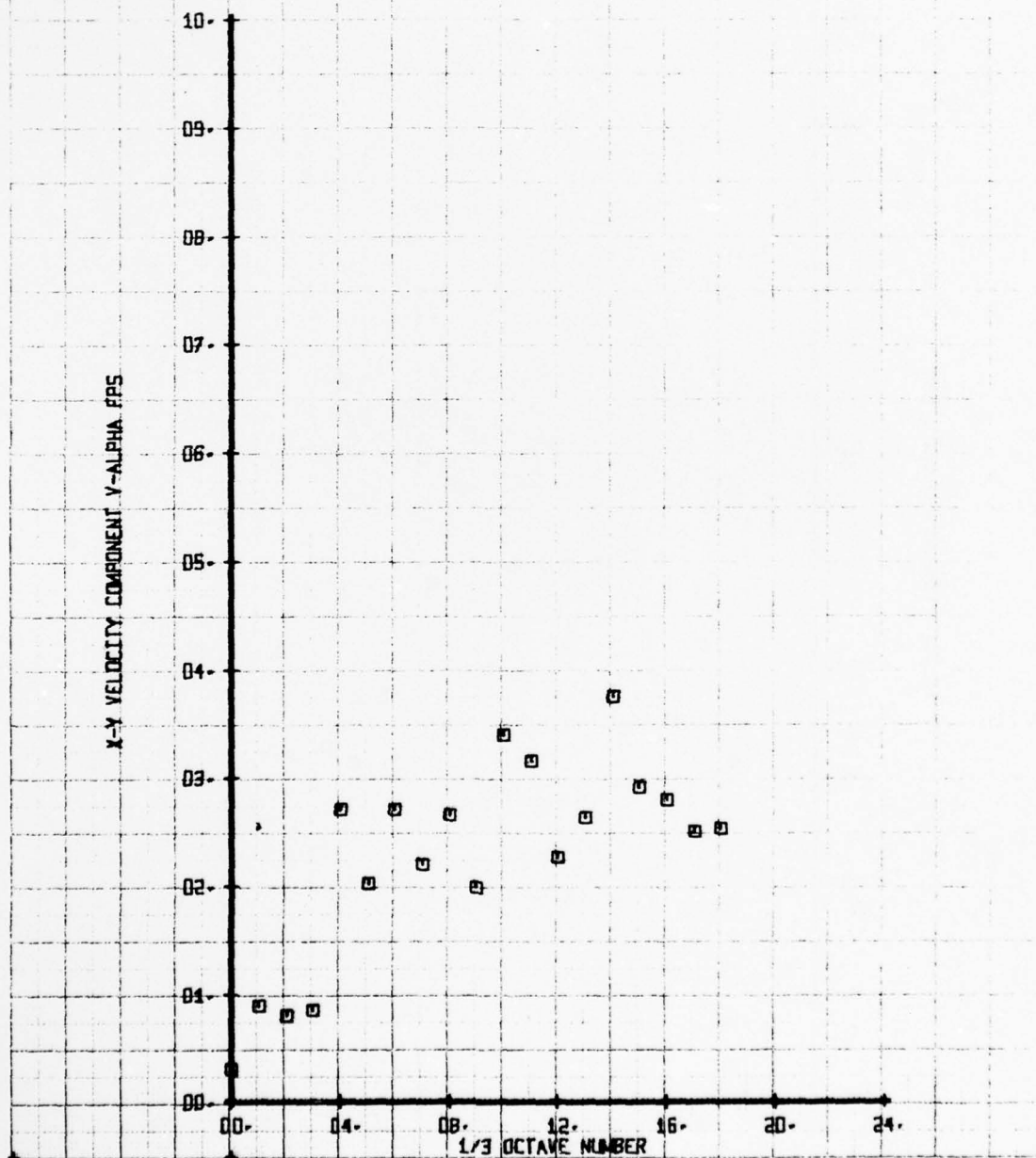
LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



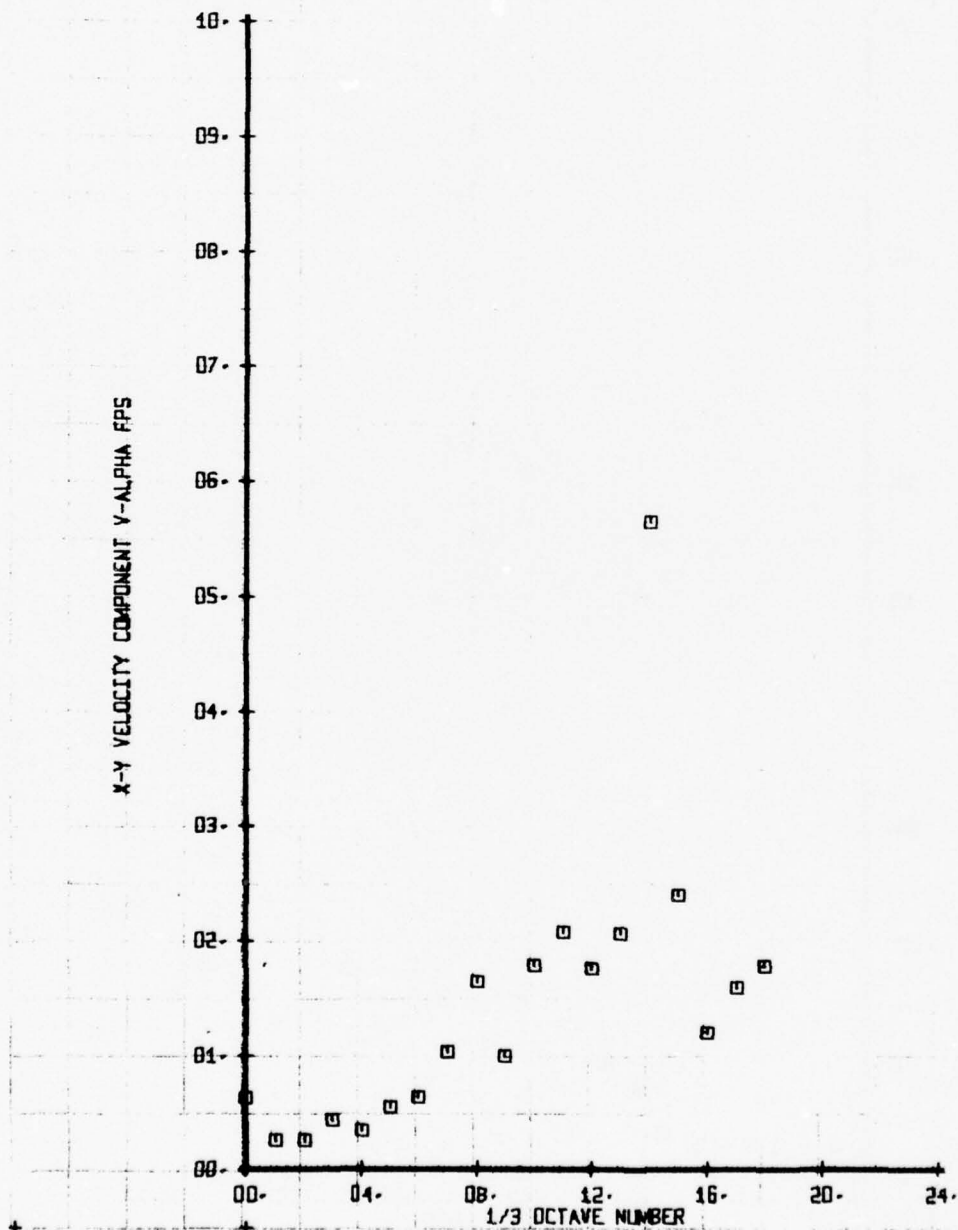
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P.A.
 RUN 137 TP 11

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17MT. SOFT P-A.
 RUN 137 TP 13

LEGEND
 CH PARAMETER
 66 V-ALPHA



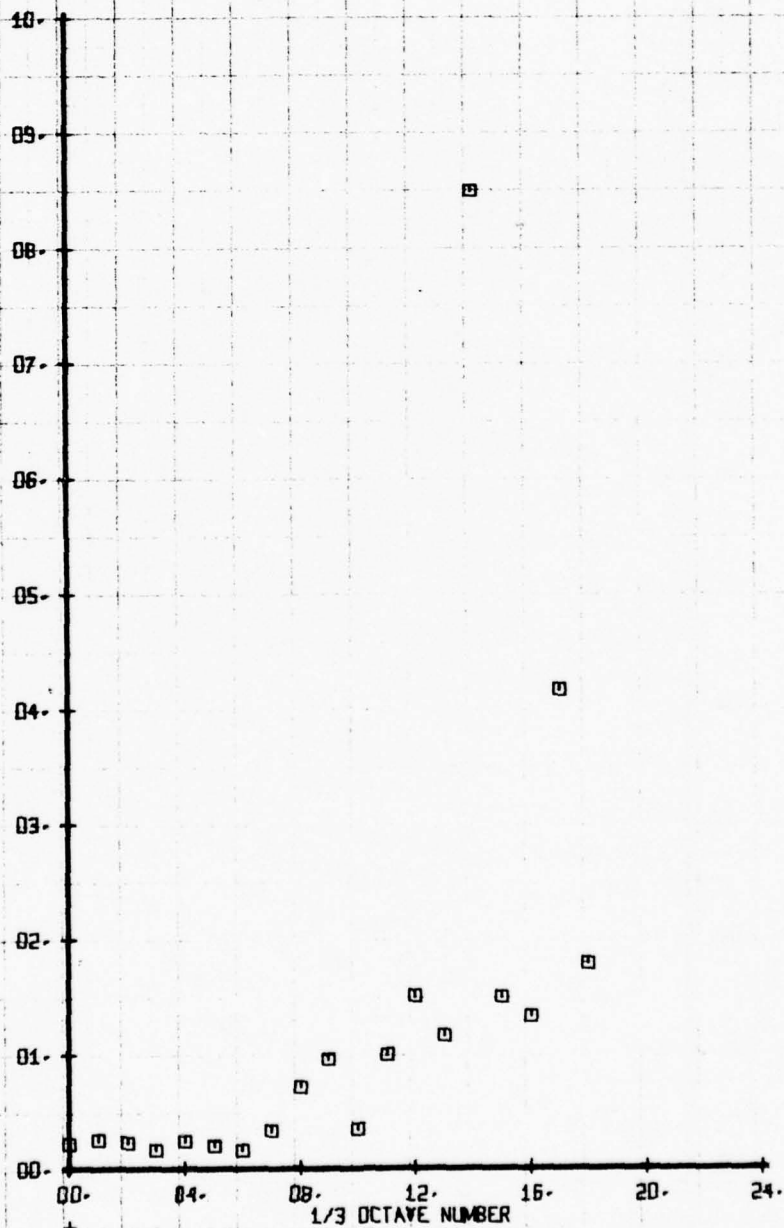
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-12HT. SDFI P-A.
 RUN 137 TP 15

SYM
 □

CH
 68

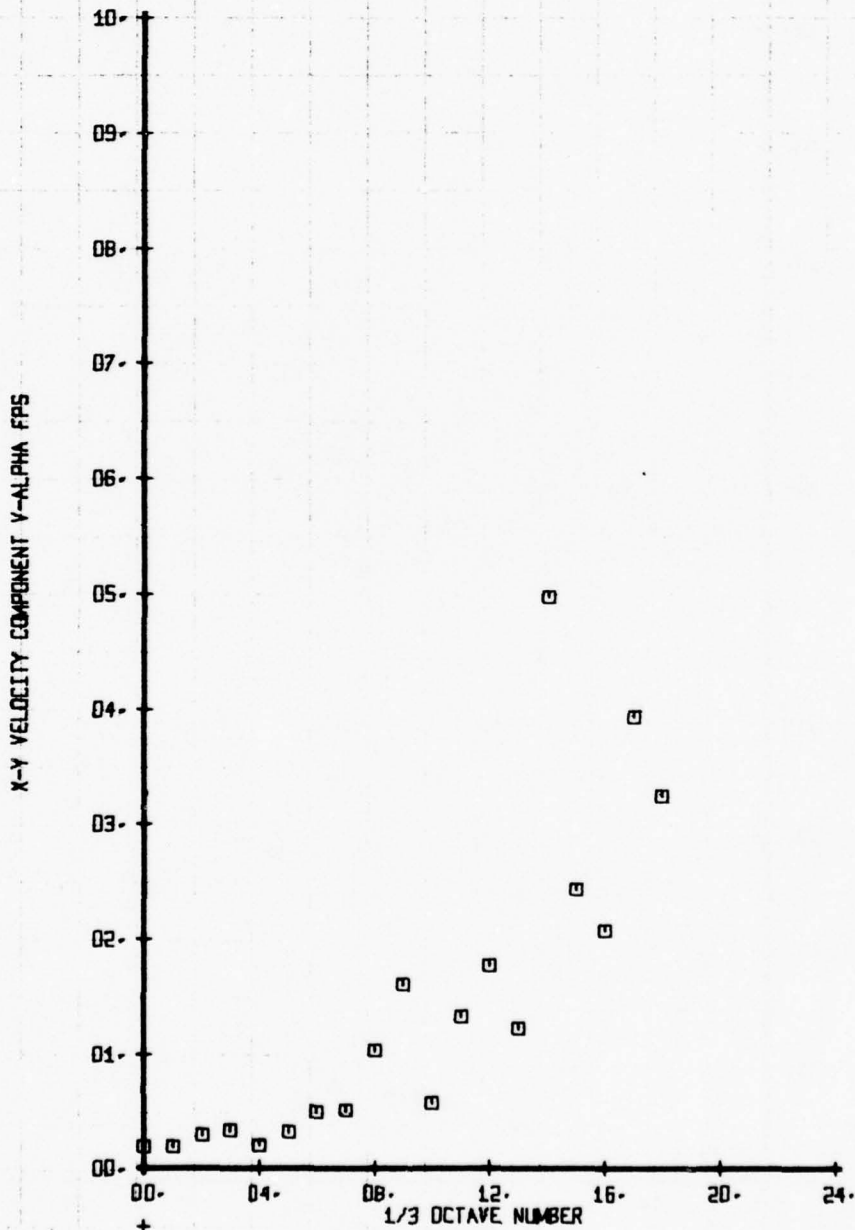
LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



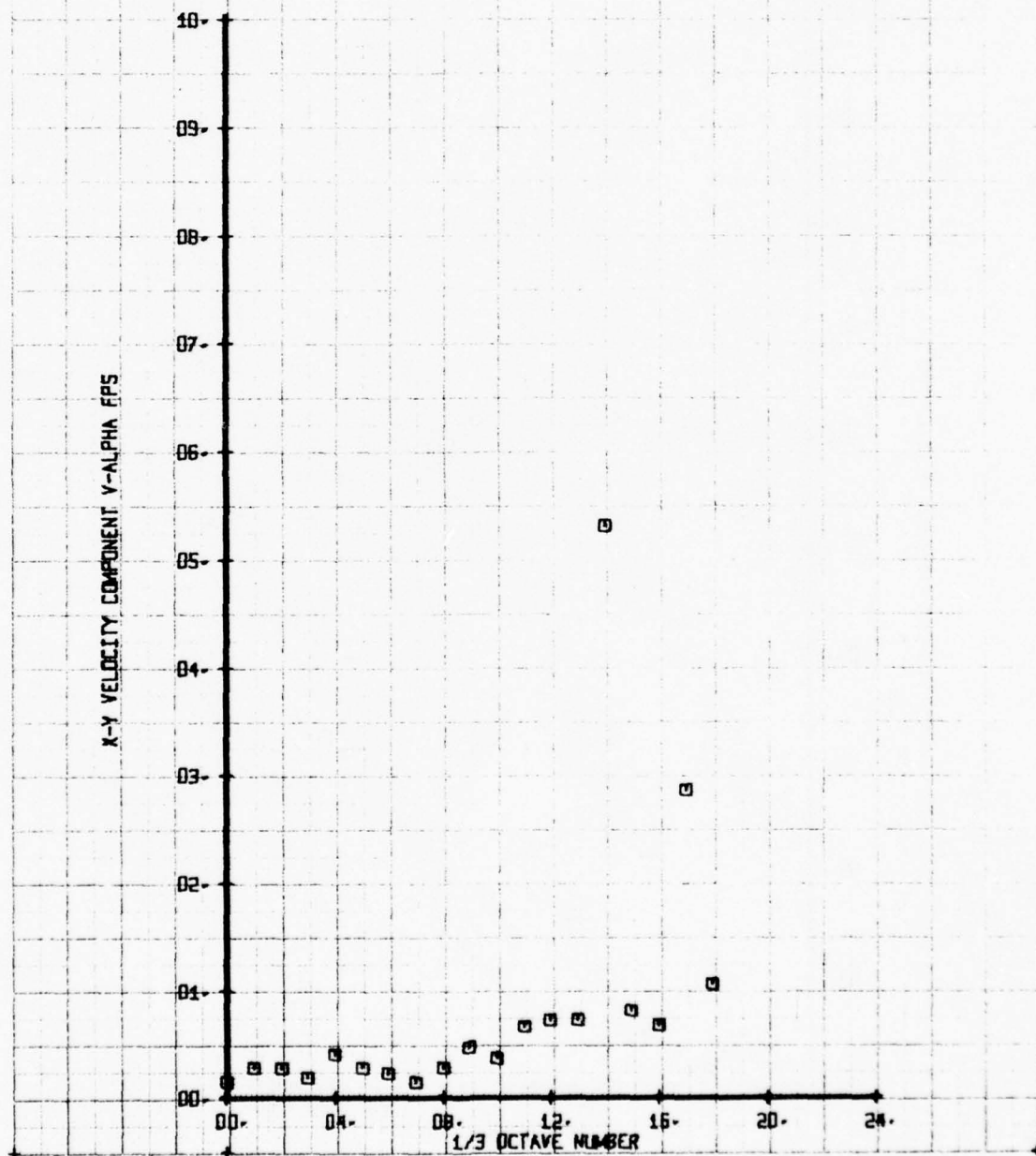
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-12HT. SDFT P-A.
 RUN 197 TP 17

SYN CH PARAMETER
 0 66 V-ALPHA



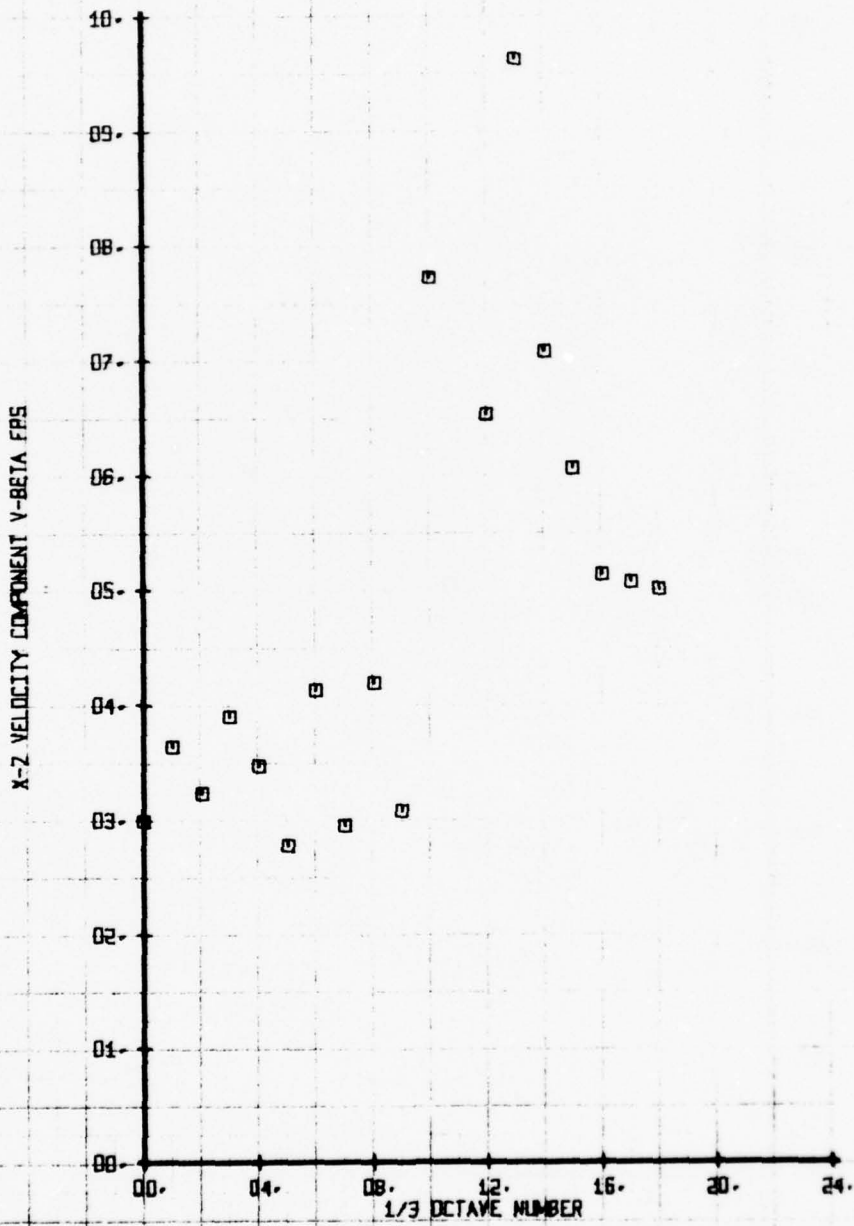
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P-A.
 RUN 137 TP 19

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT- 50FT P.A.
 RUN 137 TP 3

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA



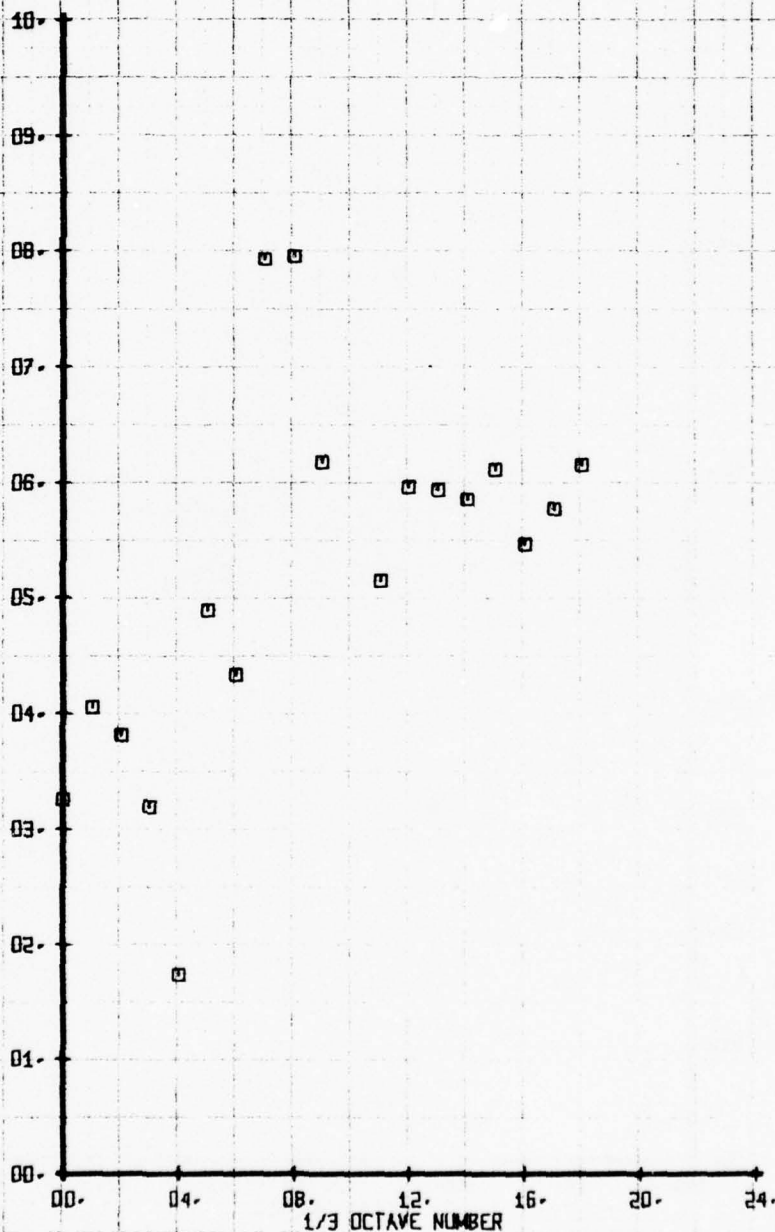
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLTID CAP-7.6DIA. 2.17HT. SOFT P.A.
 RUN 137 TP 5

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



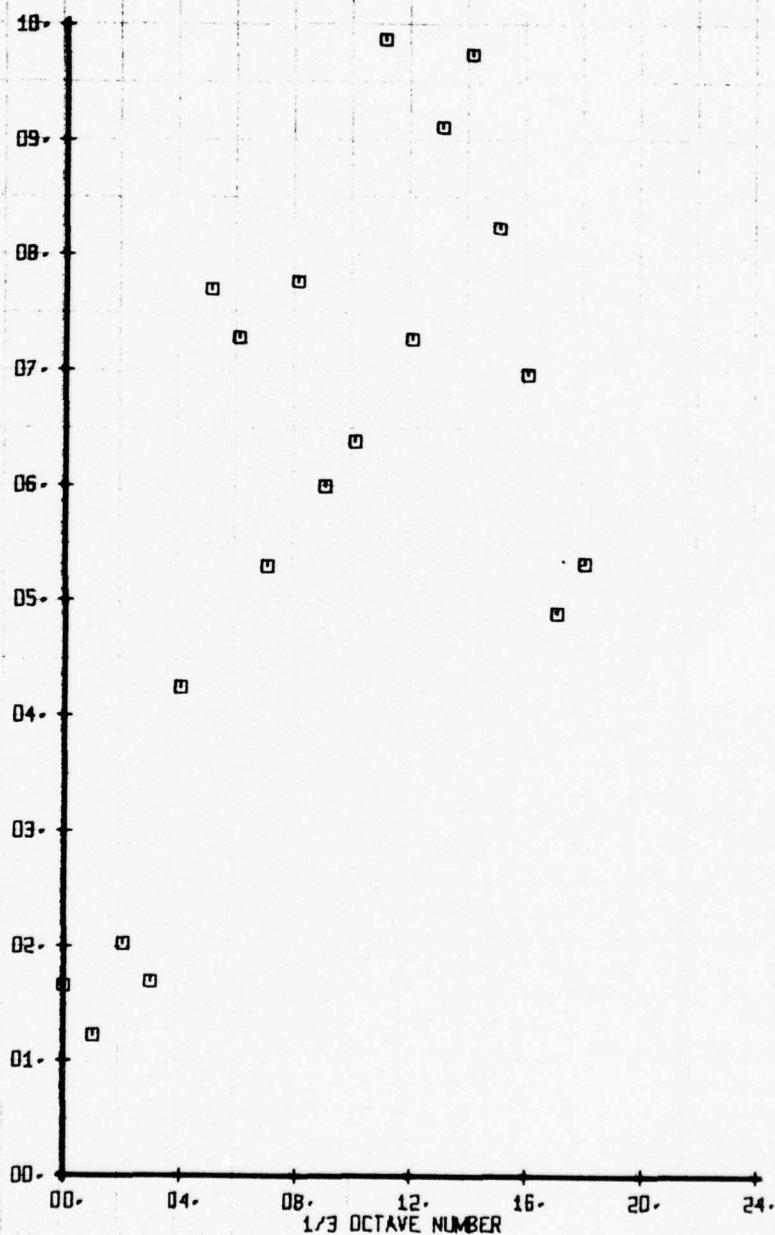
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-80IA- 2-17MT- SOFT P-A-
 RUN 137 TP 7

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

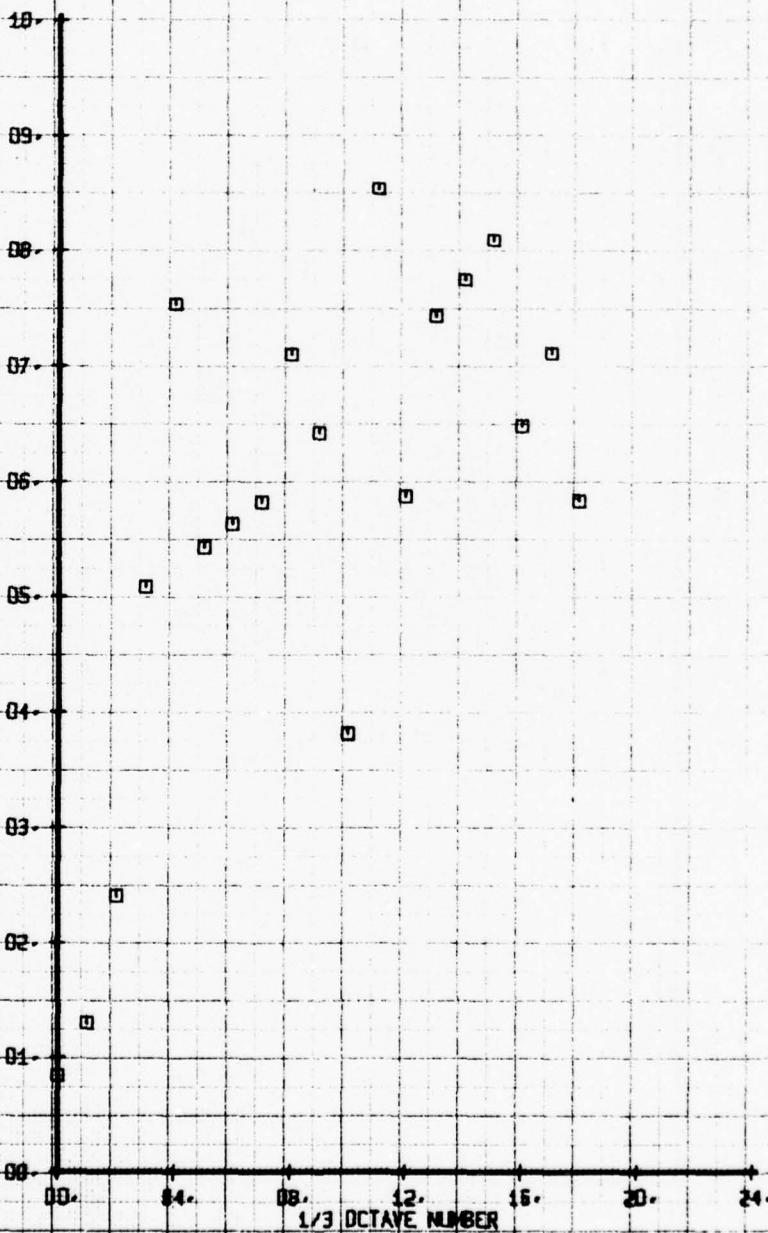
X-Z VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-60IA- 2-17HT- SDFI P-A.
 RUN 137 TP 9

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

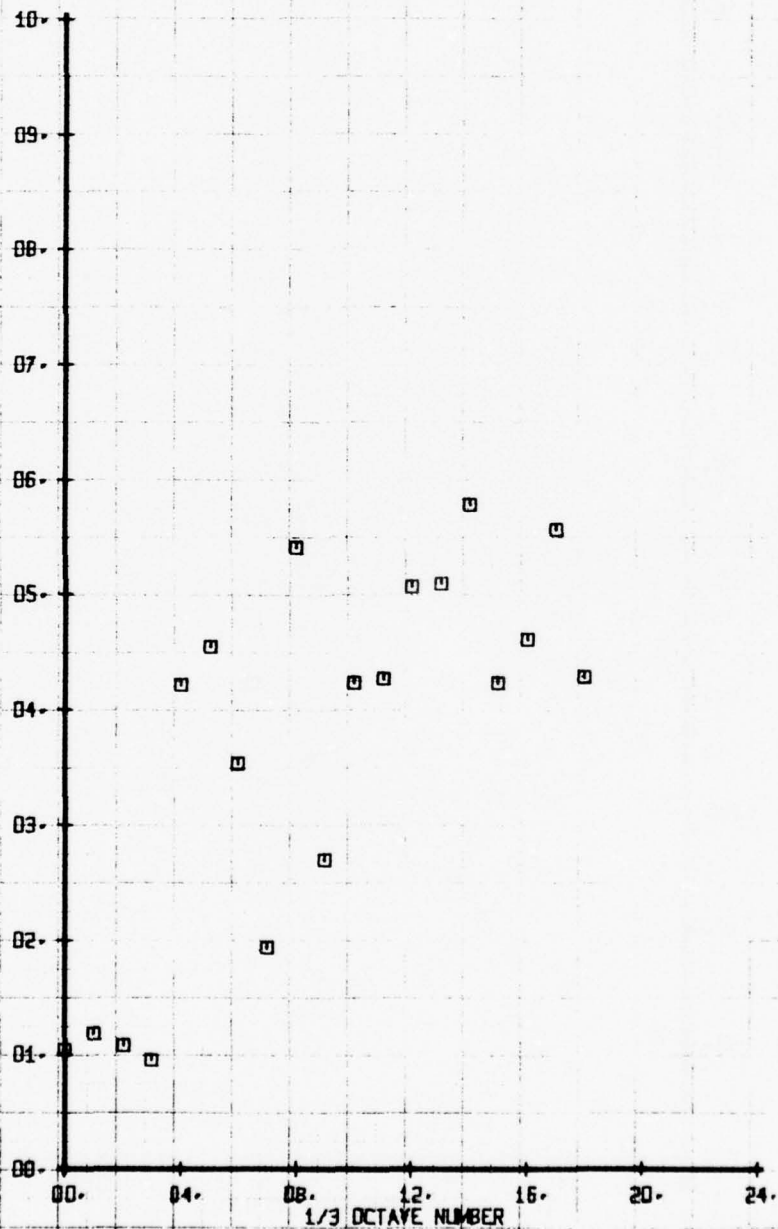
X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2.17HT. SOFT P-A.
 RUN 197 TP 11

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



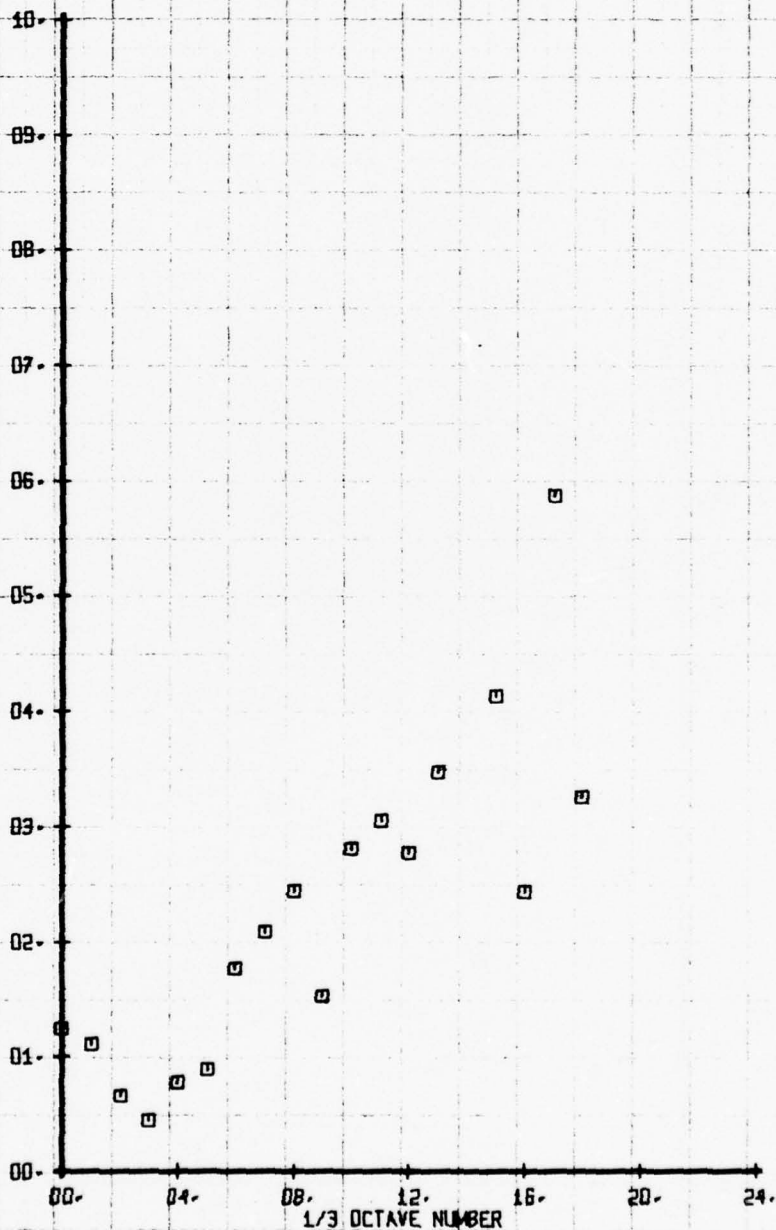
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SDET P-A.
 RUN 197 TP 13

SYM
 0

CH
 65

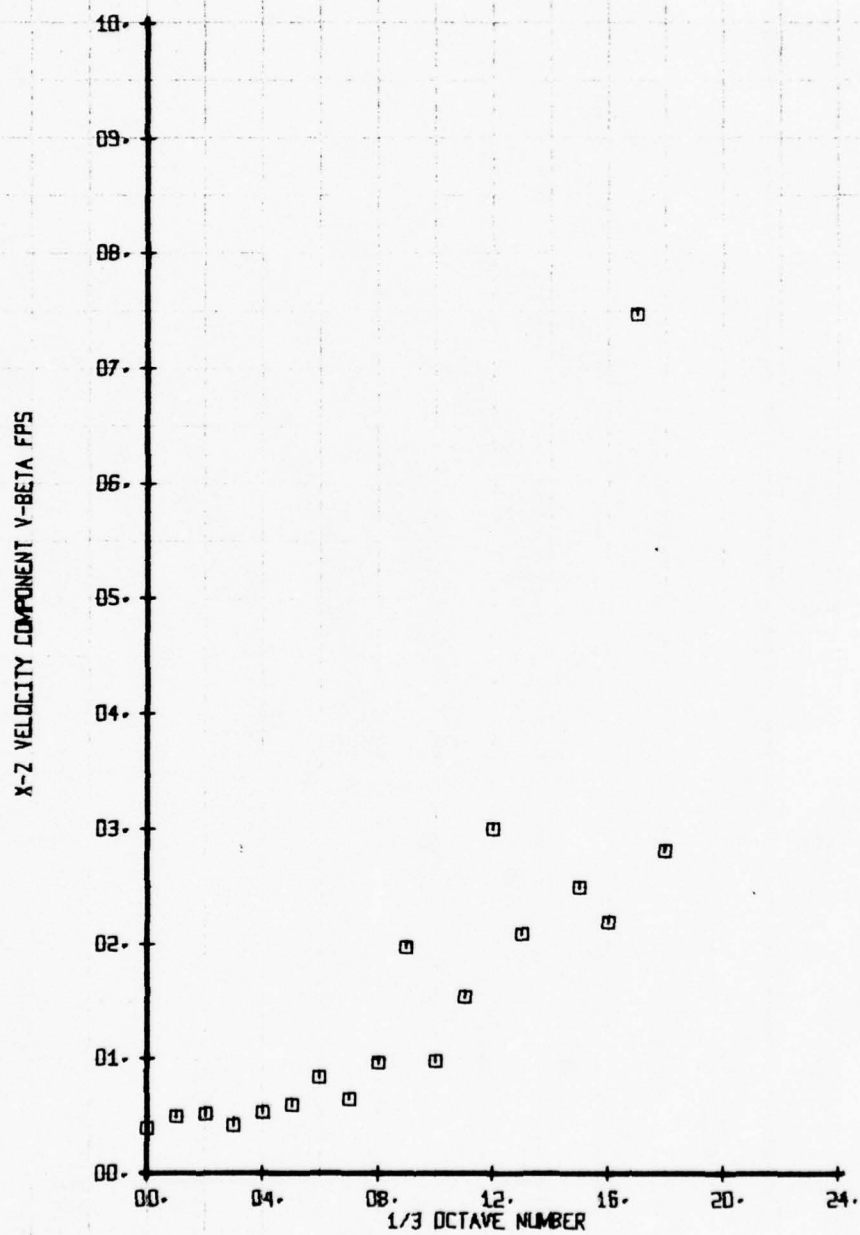
LEGEND
 PARAMETER
 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



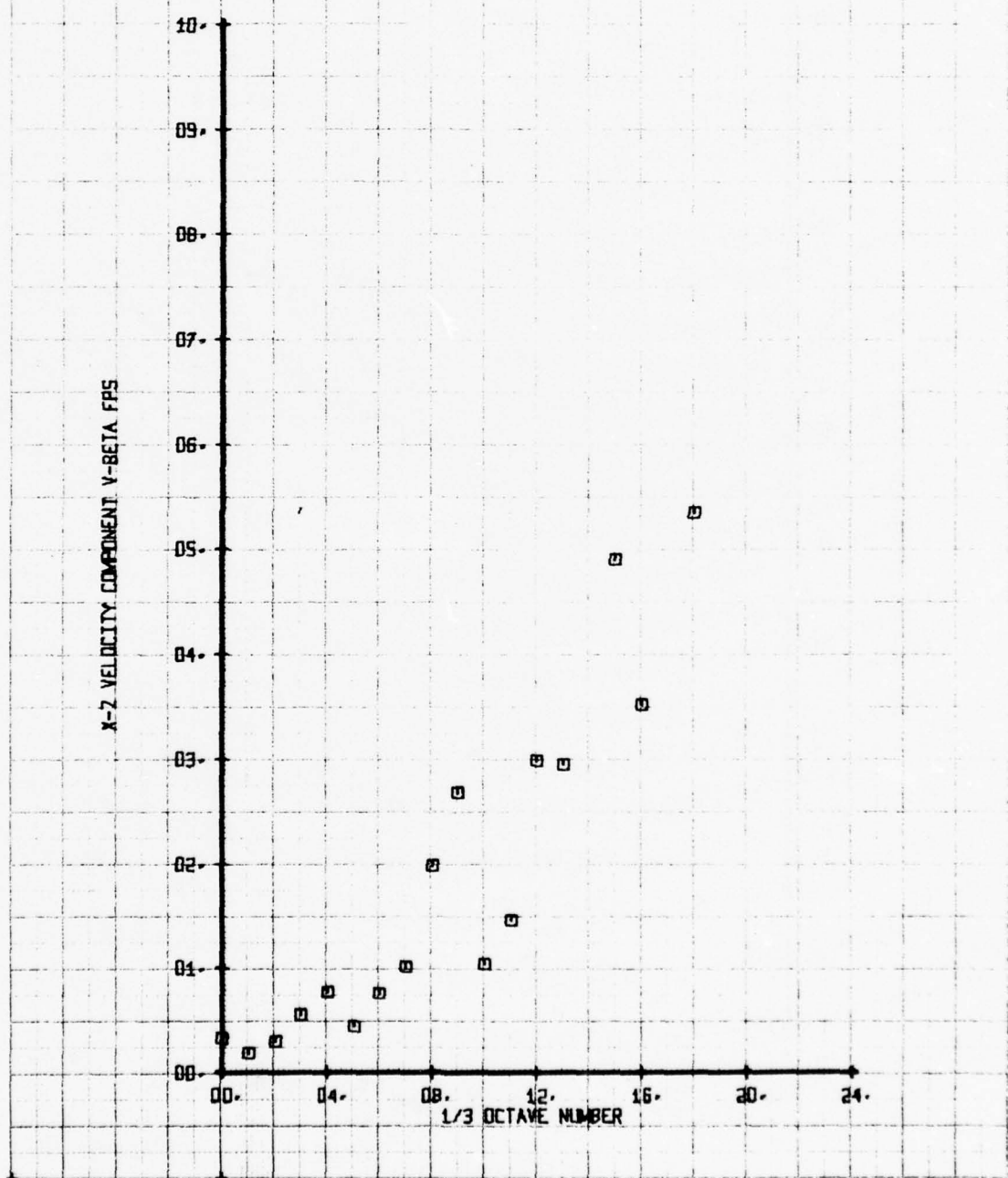
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P.A.
 RUN 137 TP 15

LEGEND
 SYM CH. PARAMETER
 □ 65 V-BETA



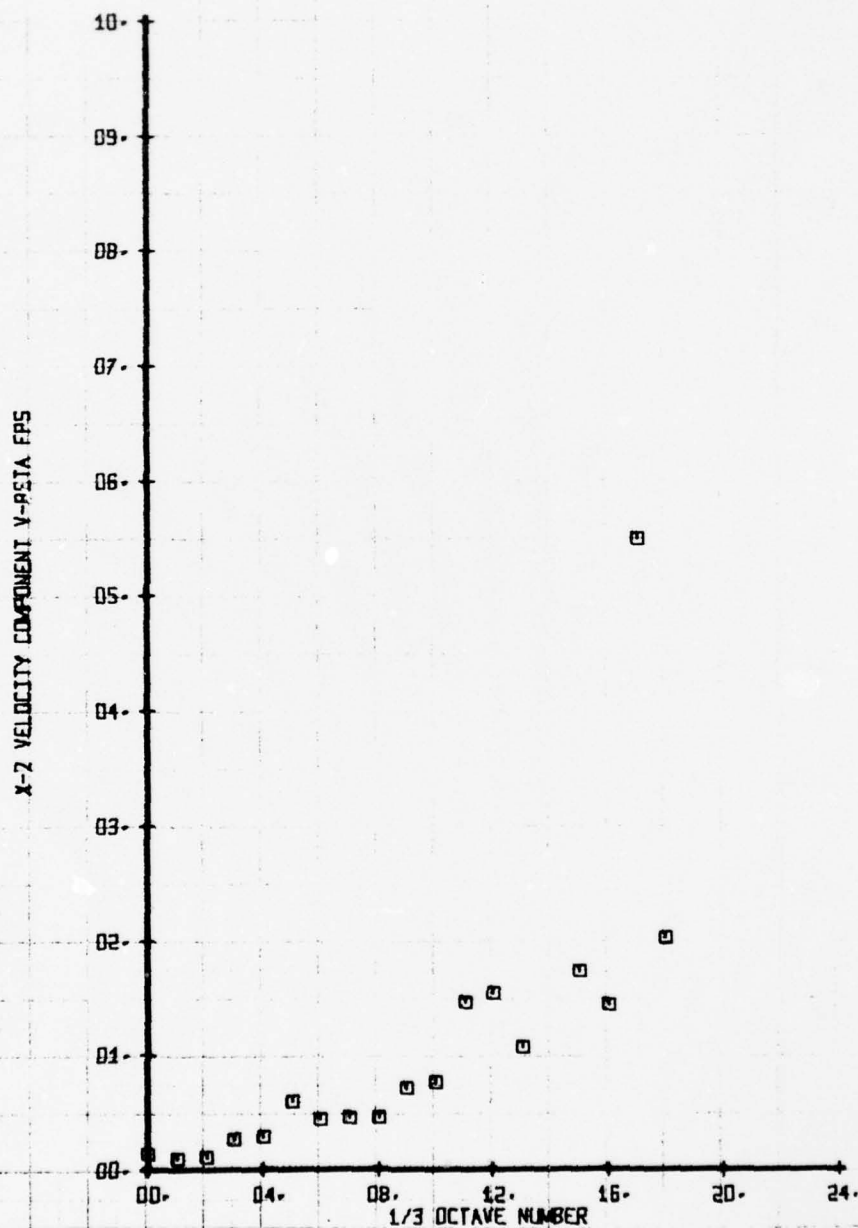
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFI P-A.
 RUN 137 TP 17

SYM CH PARAMETER
 0 65 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.6DIA. 2-17HT. SOFT P-A.
 RUN 137 TP 19

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

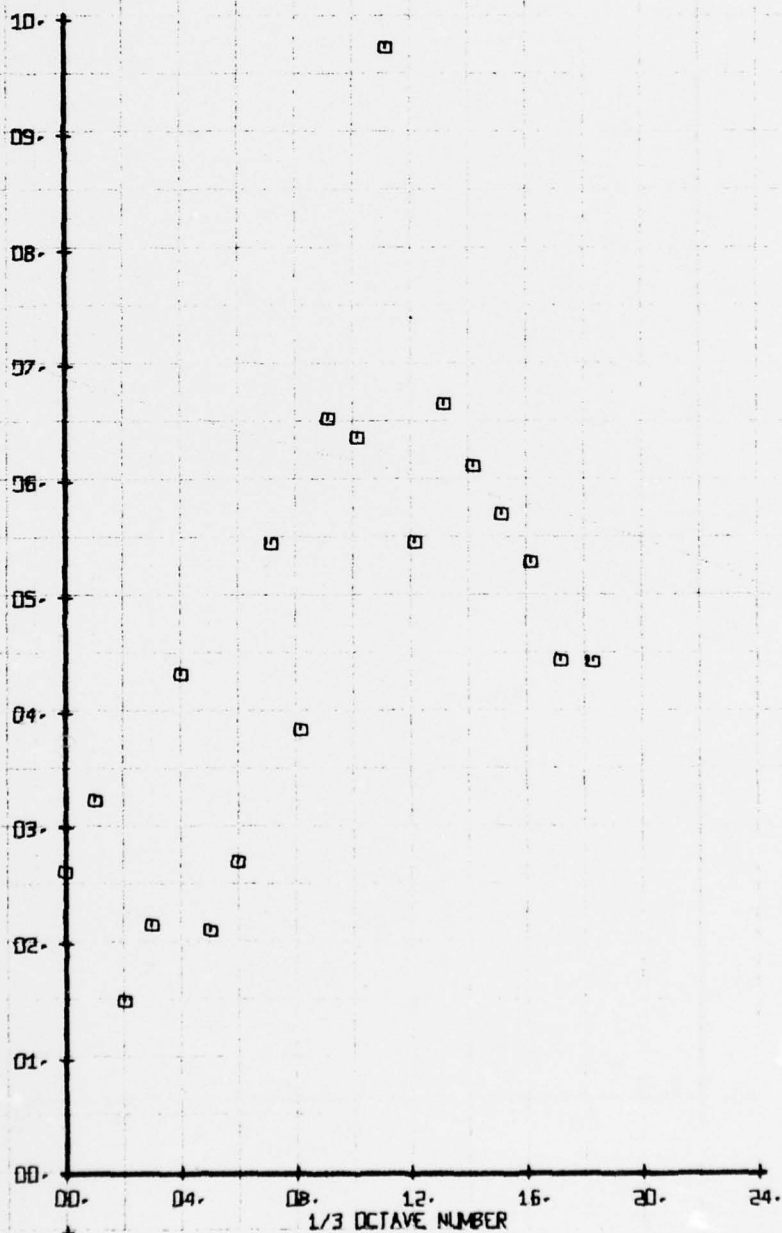


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
SOLID CAP-7-1601A-2-17HT- STIFF P-A-
RUN 153 TP 2

SYM
□

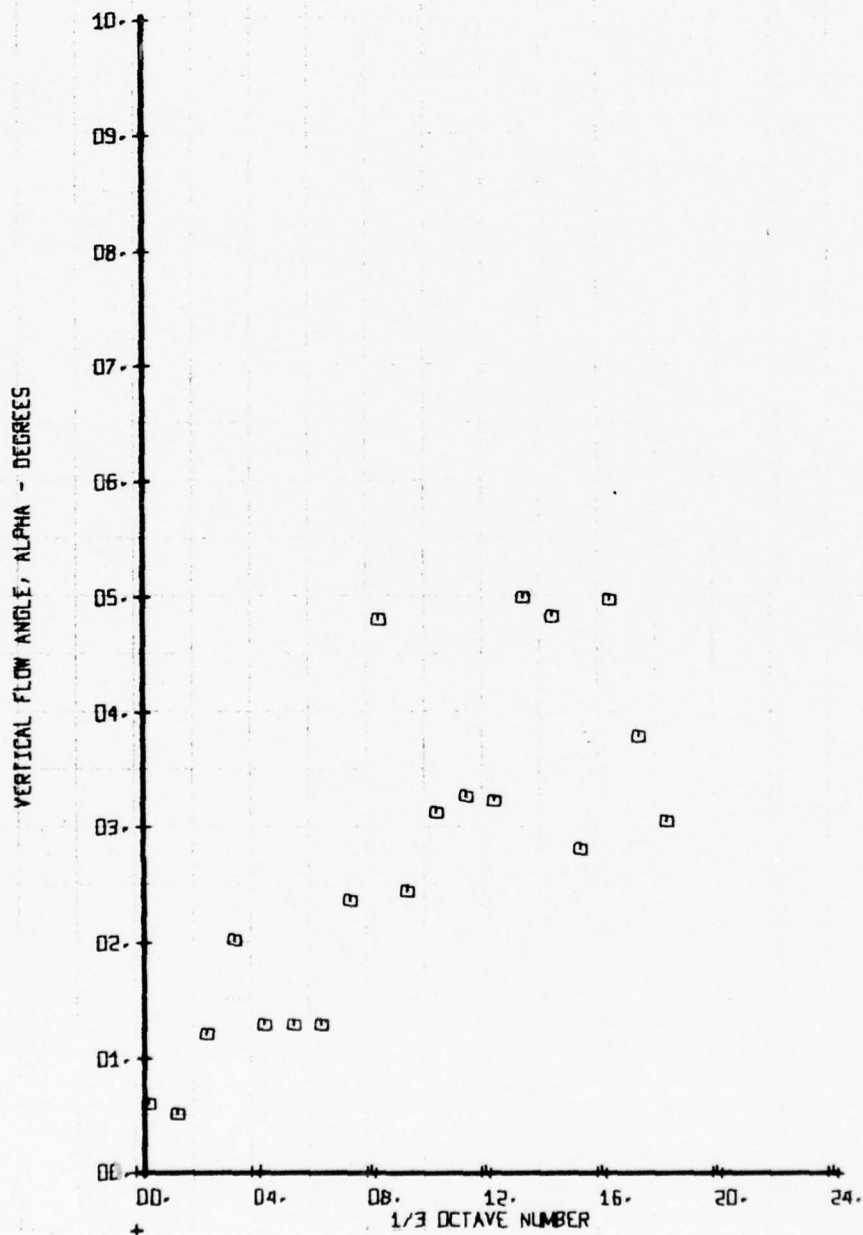
LEGEND
CH 66
PARAMETER
ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



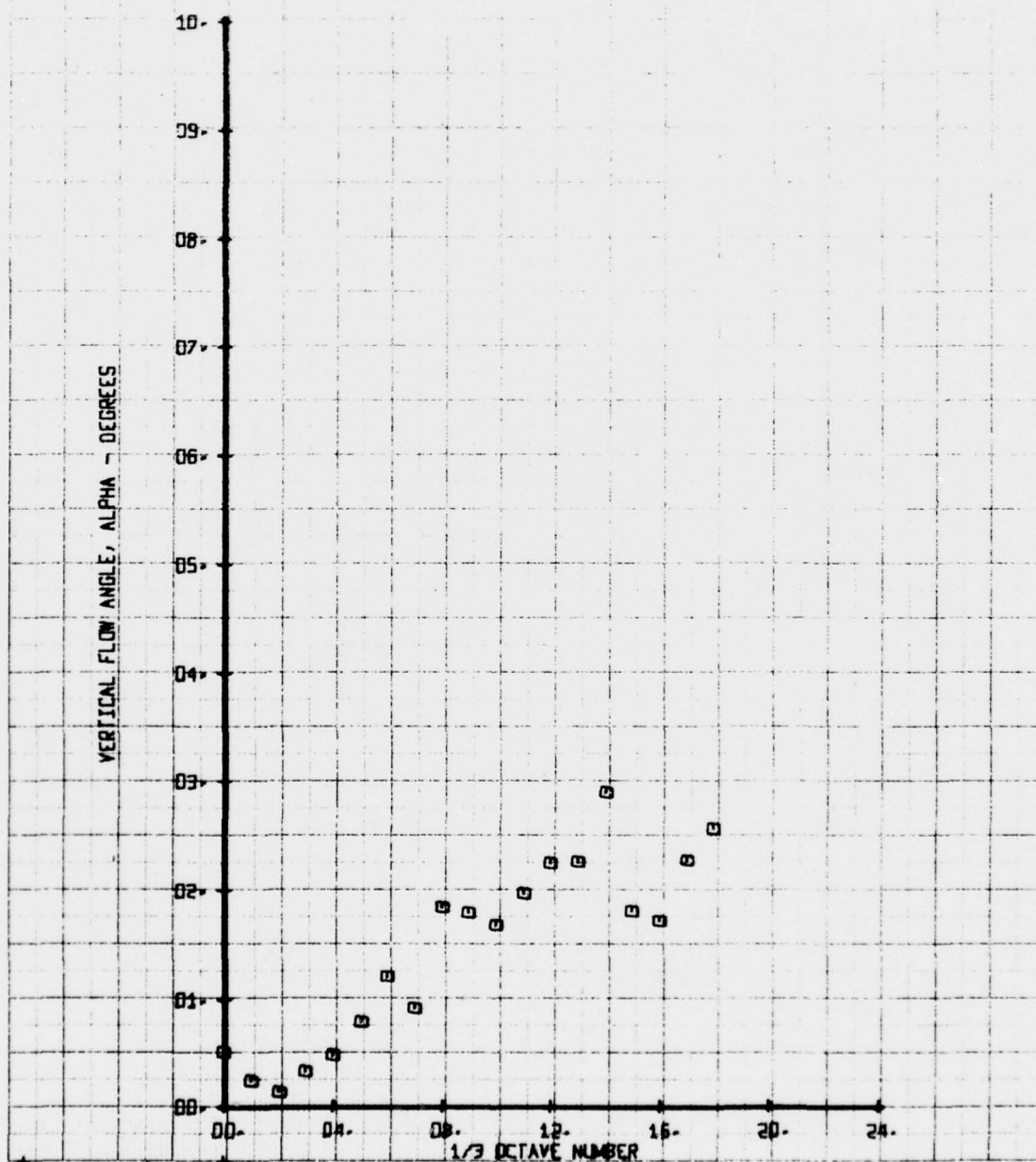
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16DIA-2-17HT- STIFF P-A-
 RUN 153 TP 3

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



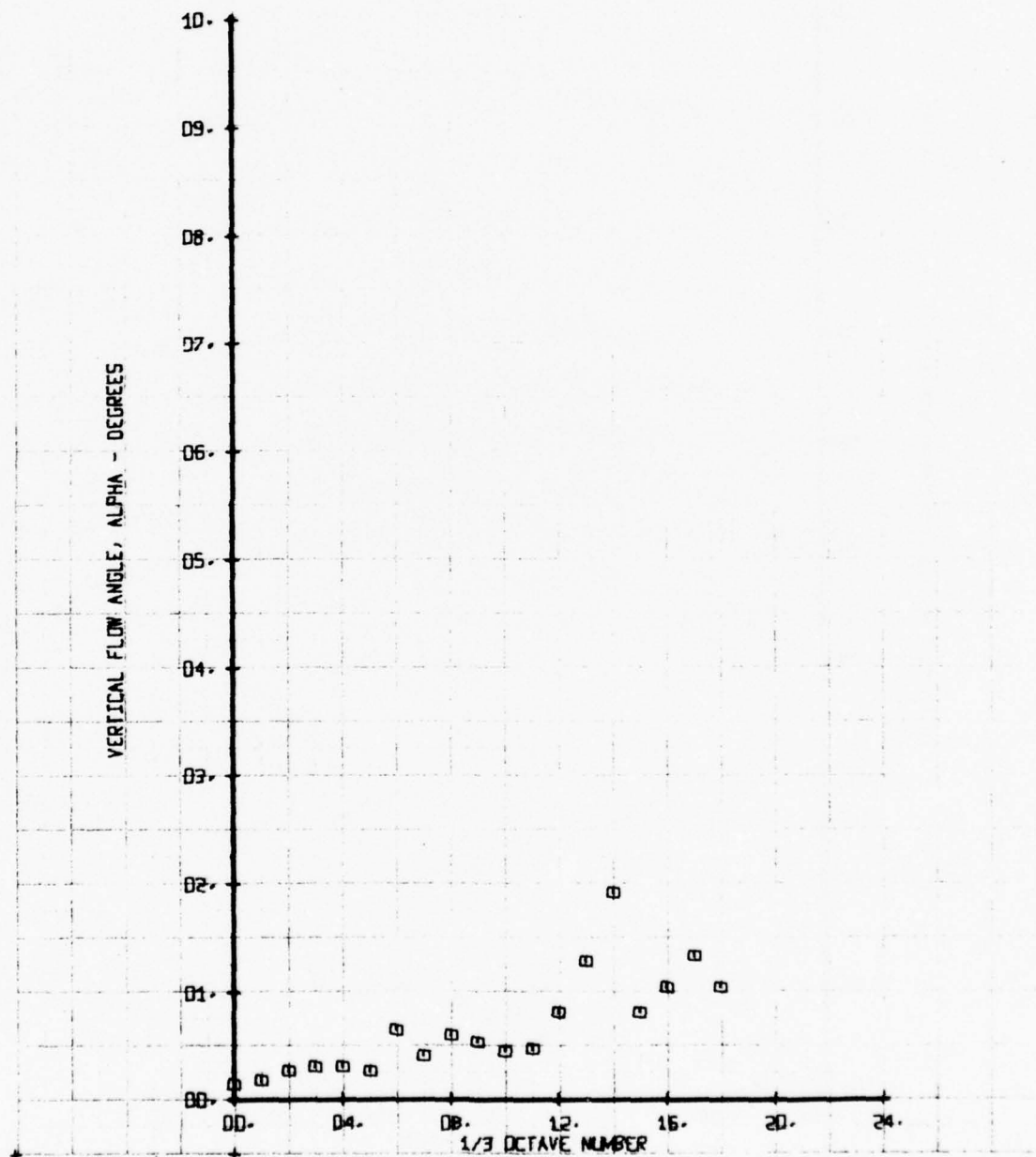
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2-17HT- STIFF P-A-
 RUN 159 TP 4

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



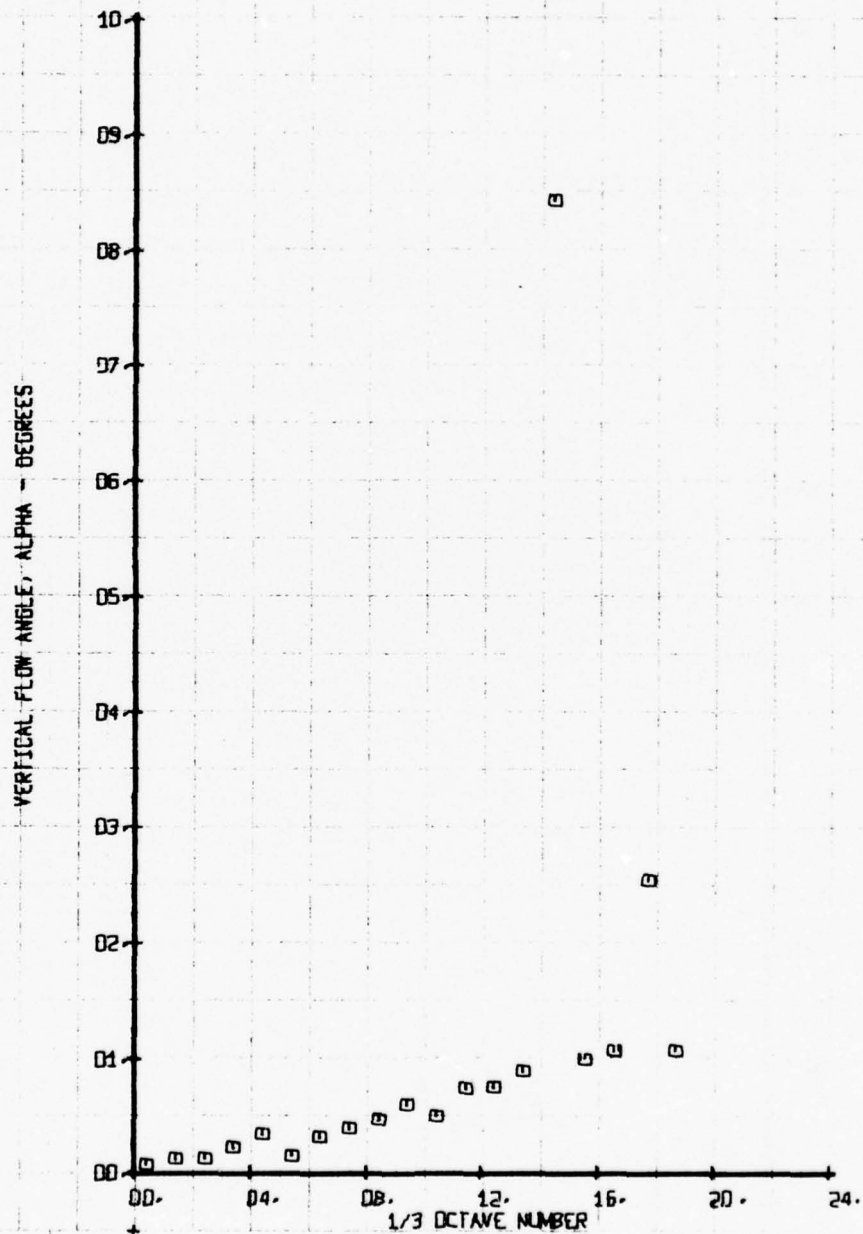
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16DIA-2-17HT- STIFF P-A-
 RUN 153 TP 5

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



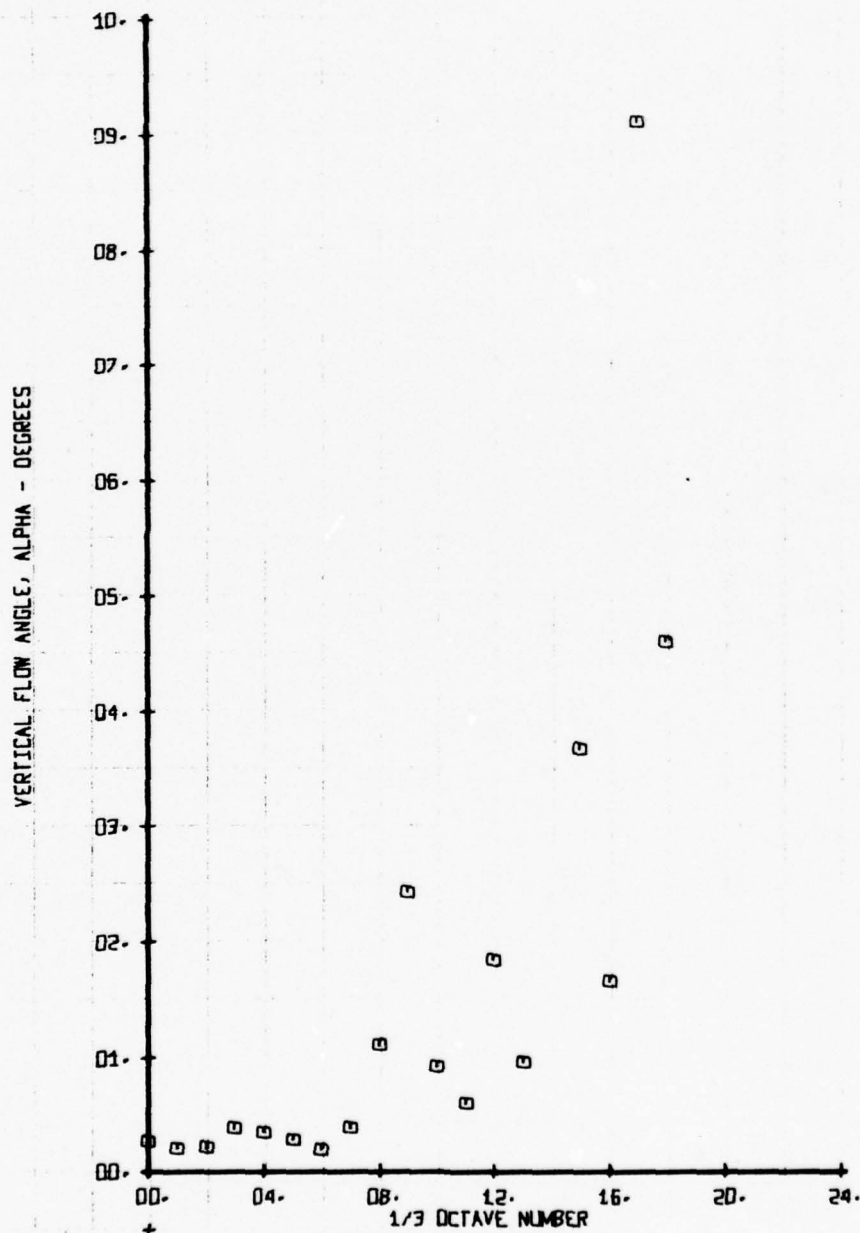
HDT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16DIA-2-17HT- STIFF P.A.
 RUN 153 TP 6

SYM CH LEGEND
 □ 66 PARAMETER
 ALPHA



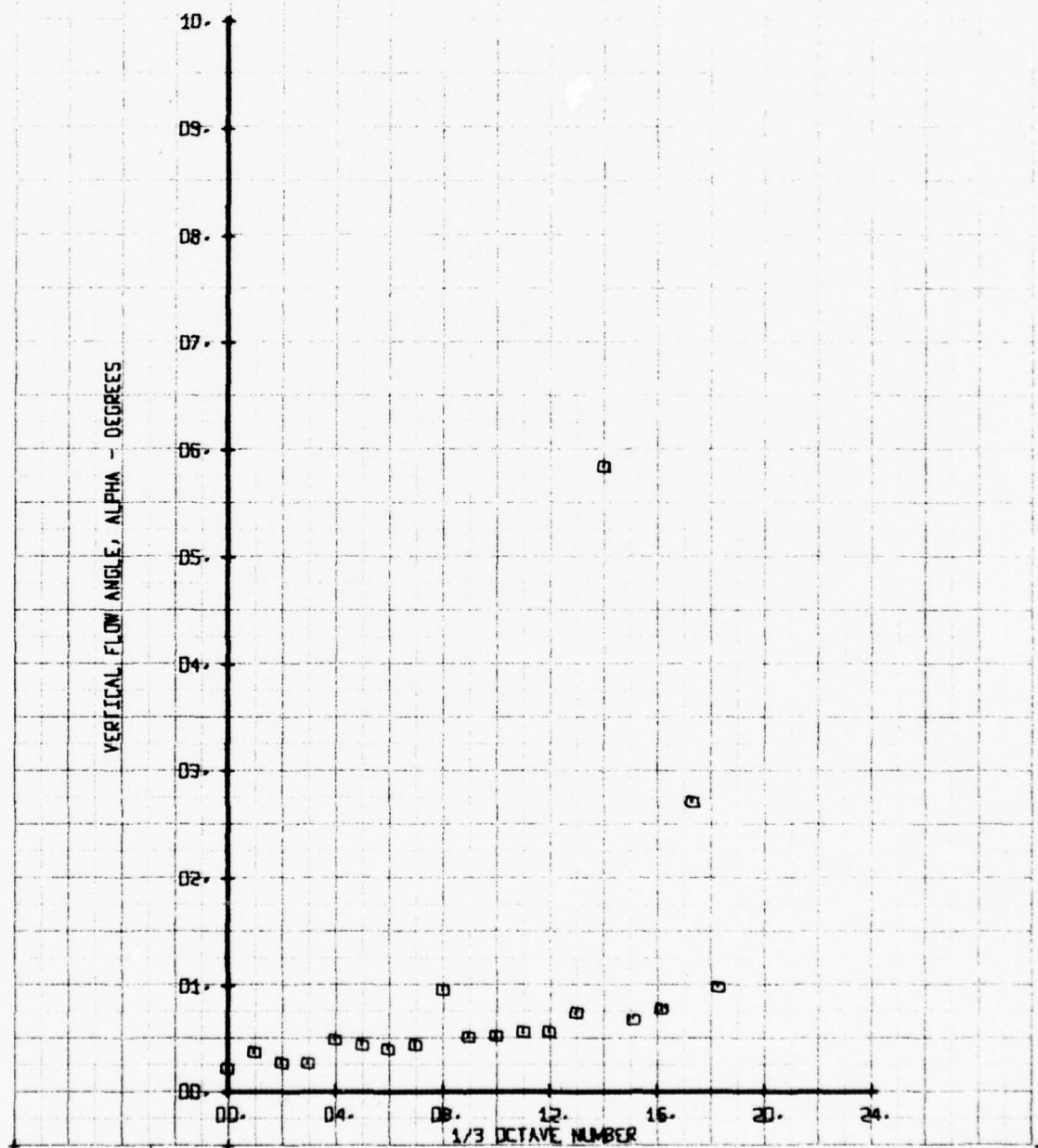
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
SOLID CAP-7-16DIA-2-17HT- STIFF P-A.
RUN 153 TP 7

LEGEND
SYM CH PARAMETER
□ 66 ALPHA



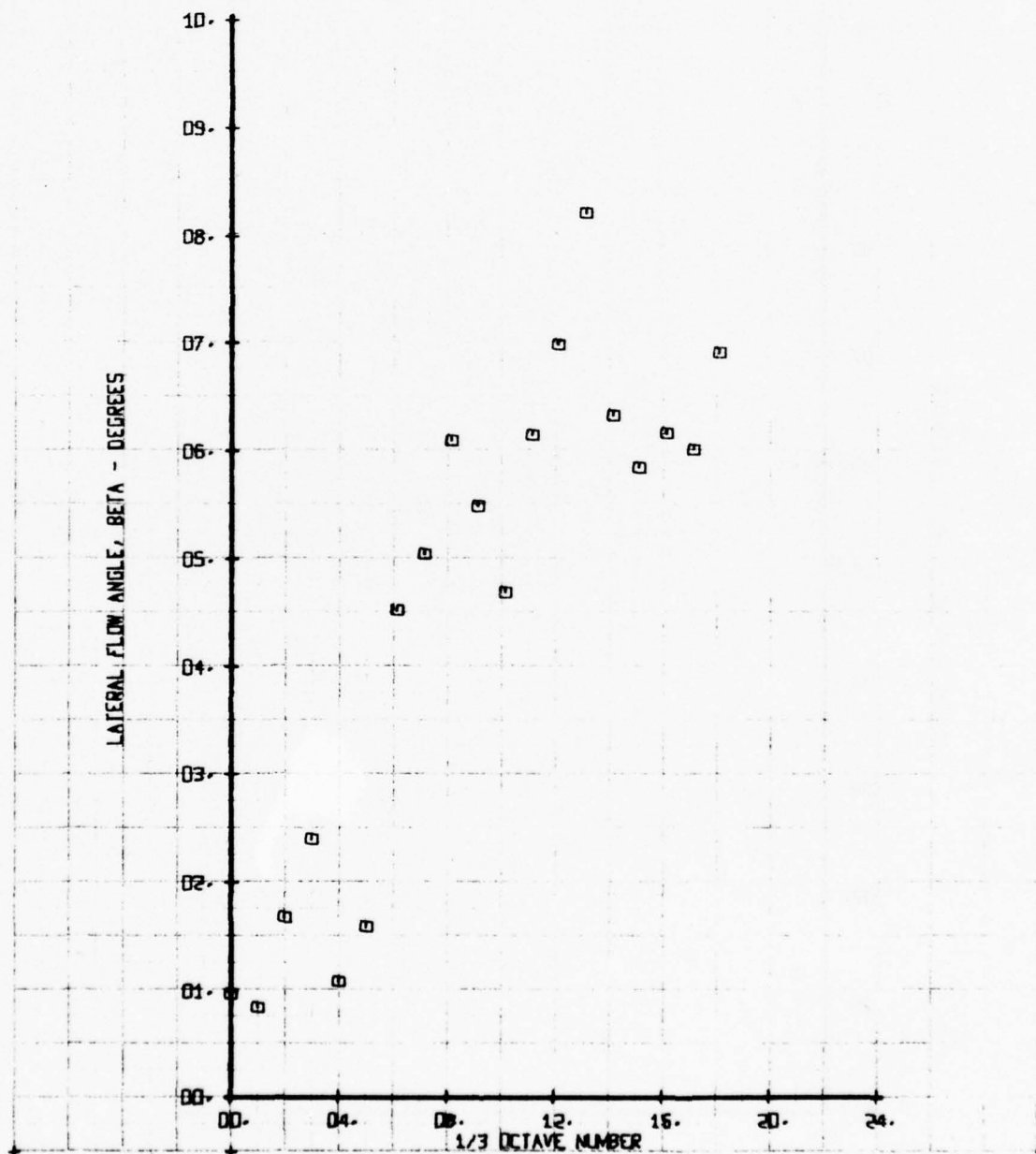
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P.A.
 RUN 153 TP 8

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P-A-
 RUN 153 TP 2

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



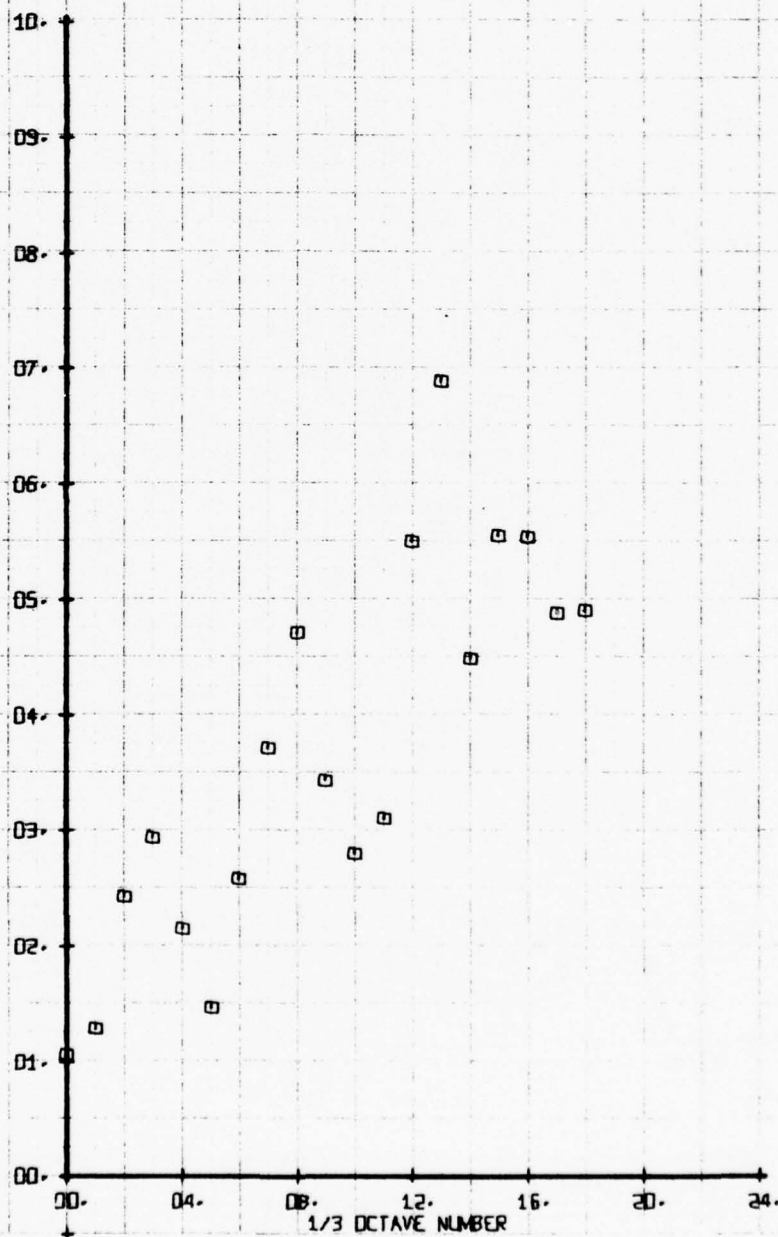
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-2.15DIA-2.17HT- STIFF P-A-
 RUN 153 TP 3

SYM
 □

CH
 65

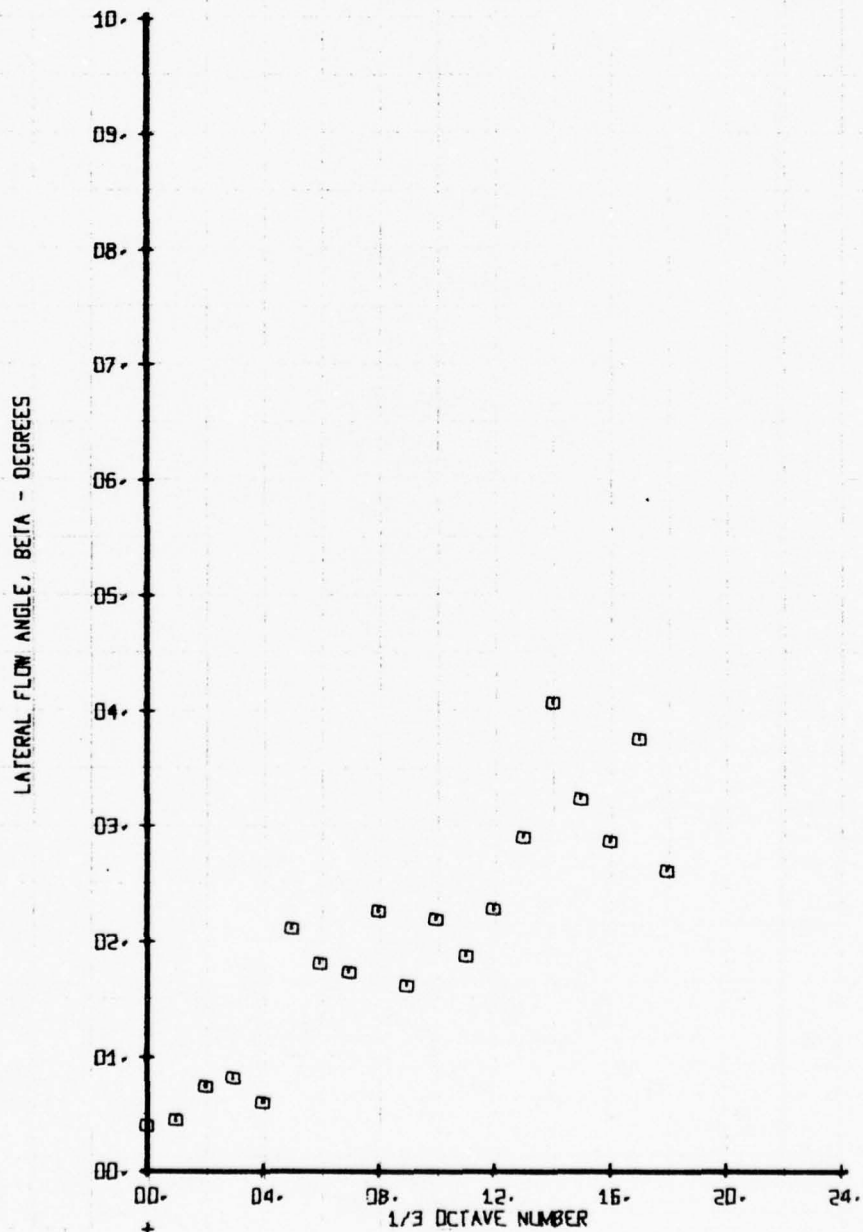
LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



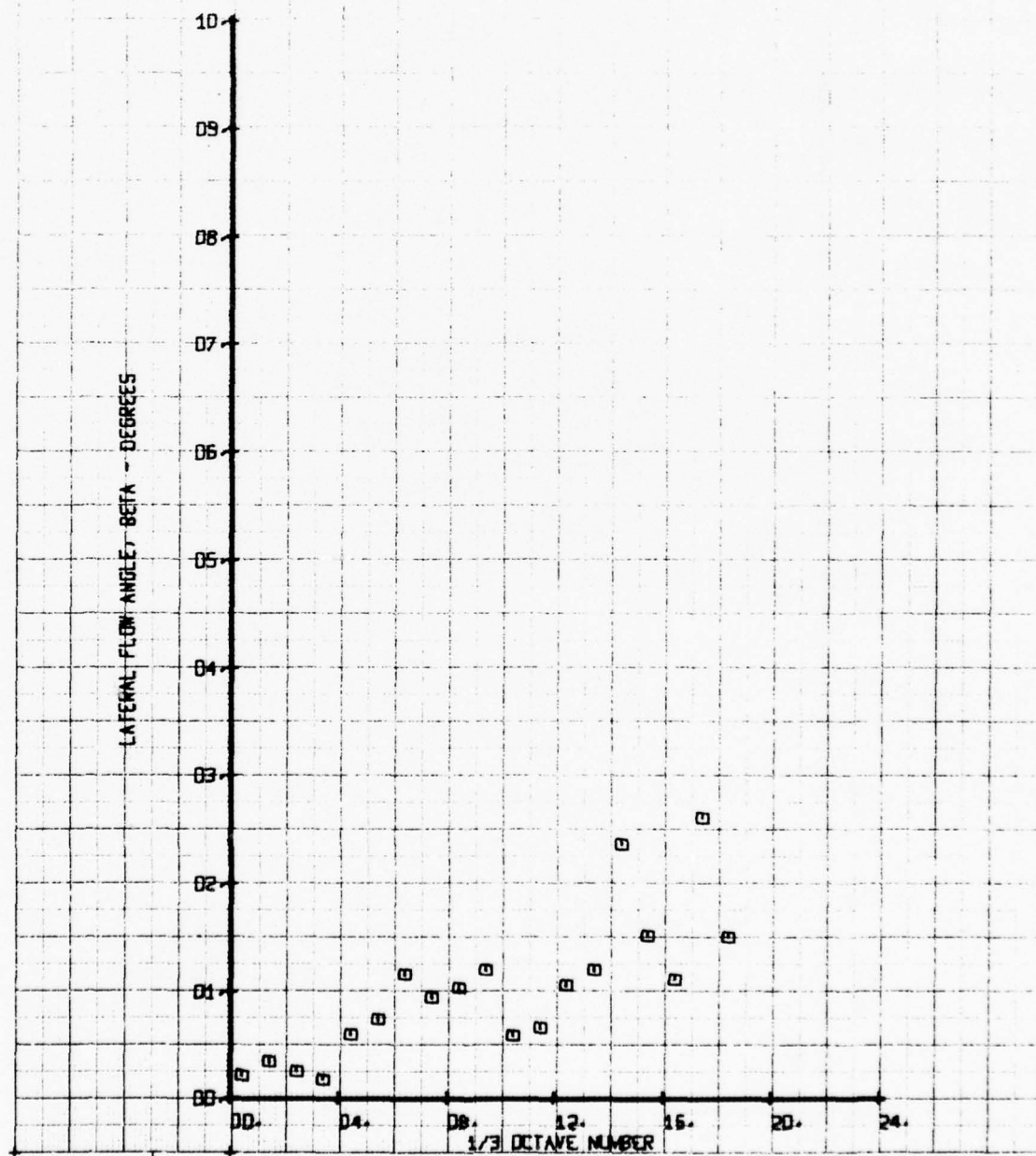
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.160IA-2-17HT. STIFF P.A.
 RUN 159 TP 4

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



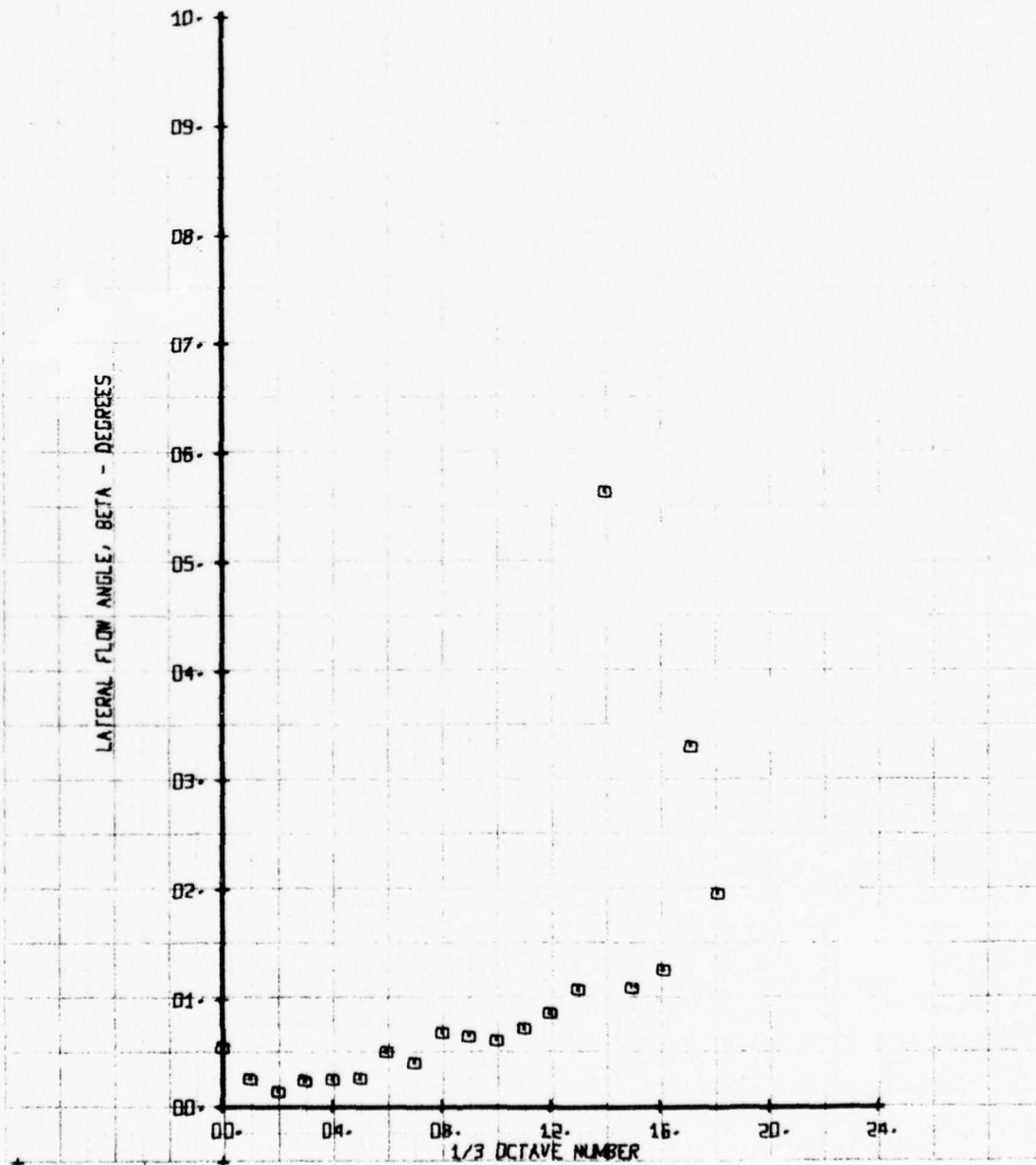
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P-A-
 RUN 153 TP 5

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



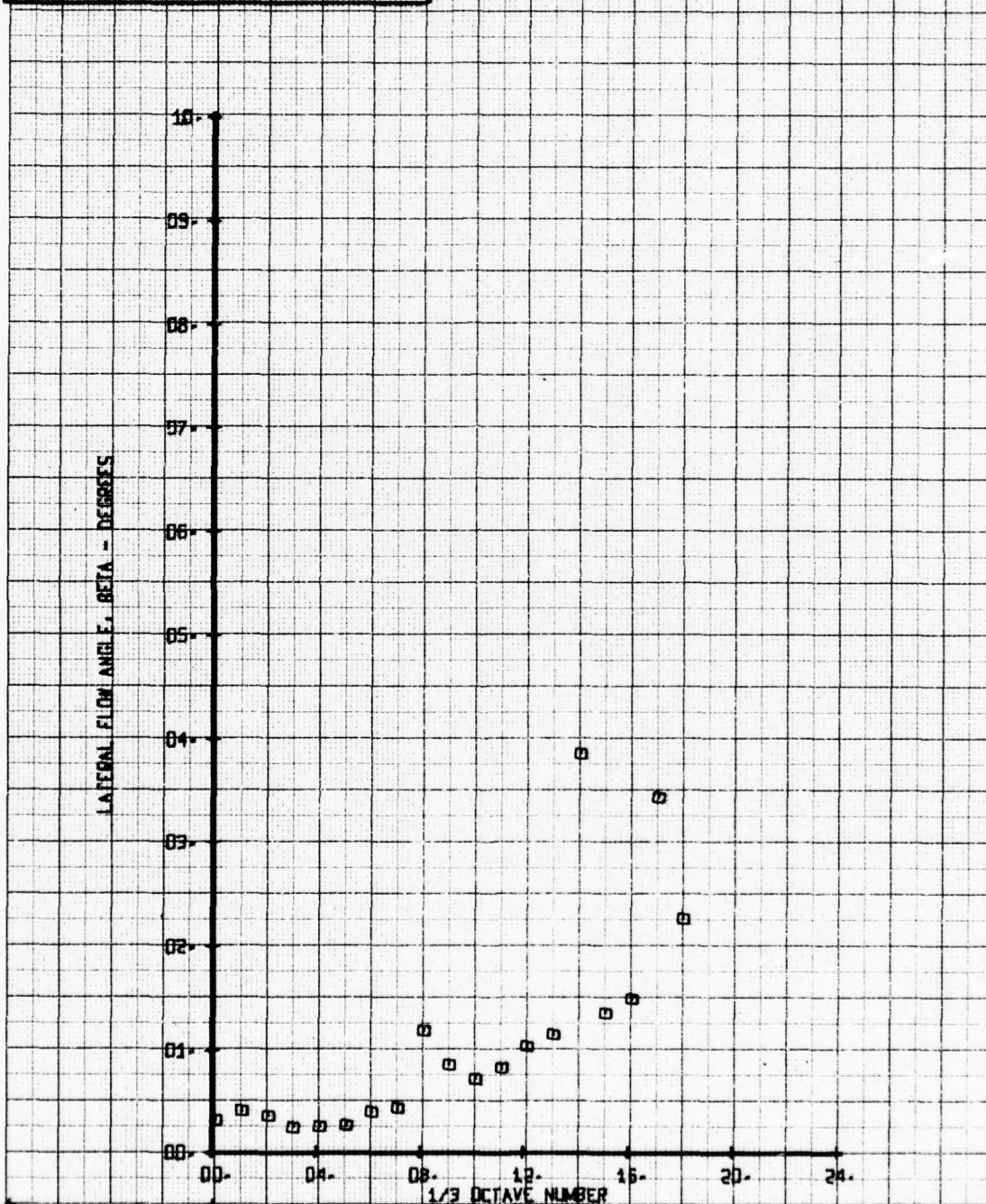
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P-A-
 RUN 153 TP 6

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-150IA-2-17HI- STIFF P.A.
 RUN 159 TP 7

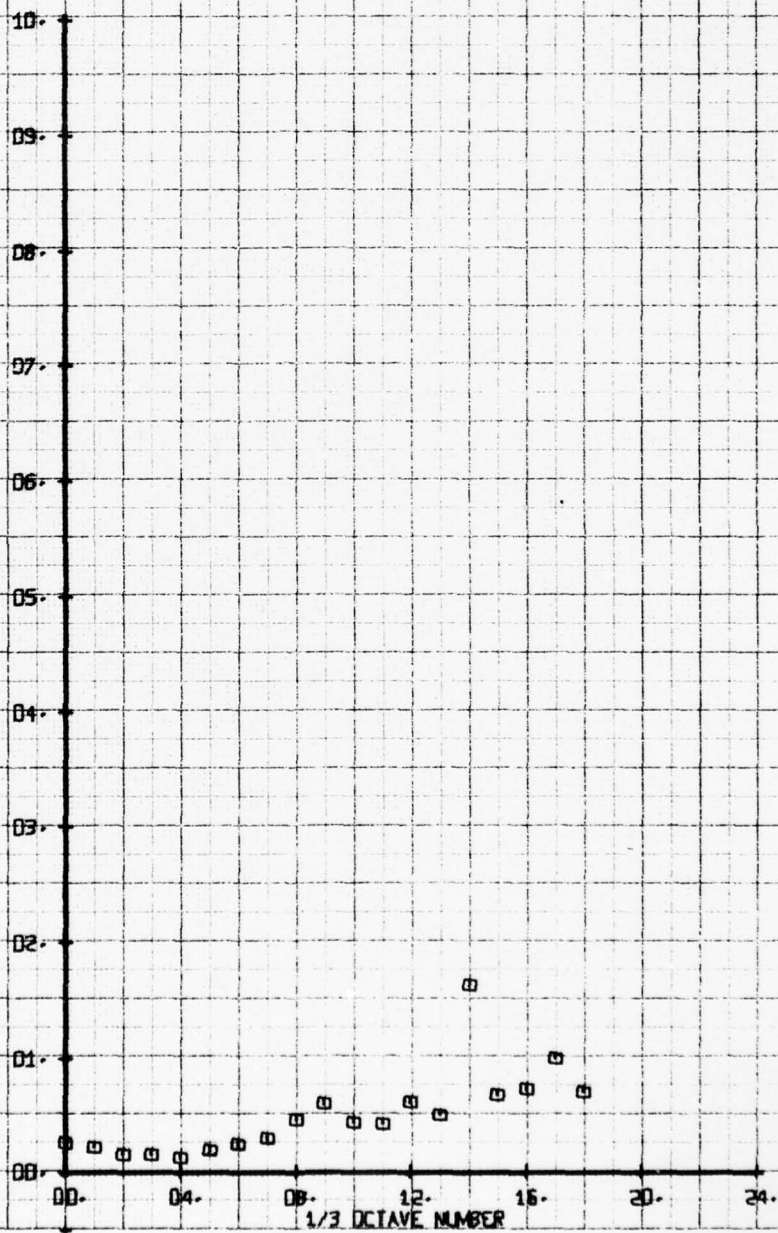
SYM CH PARAMETER
 □ 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-15DIA-2-17HT- STIFF P-A-
 RUN 153 TP 8

SYM	CH	LEGEND
□	65	PARAMETER BETA

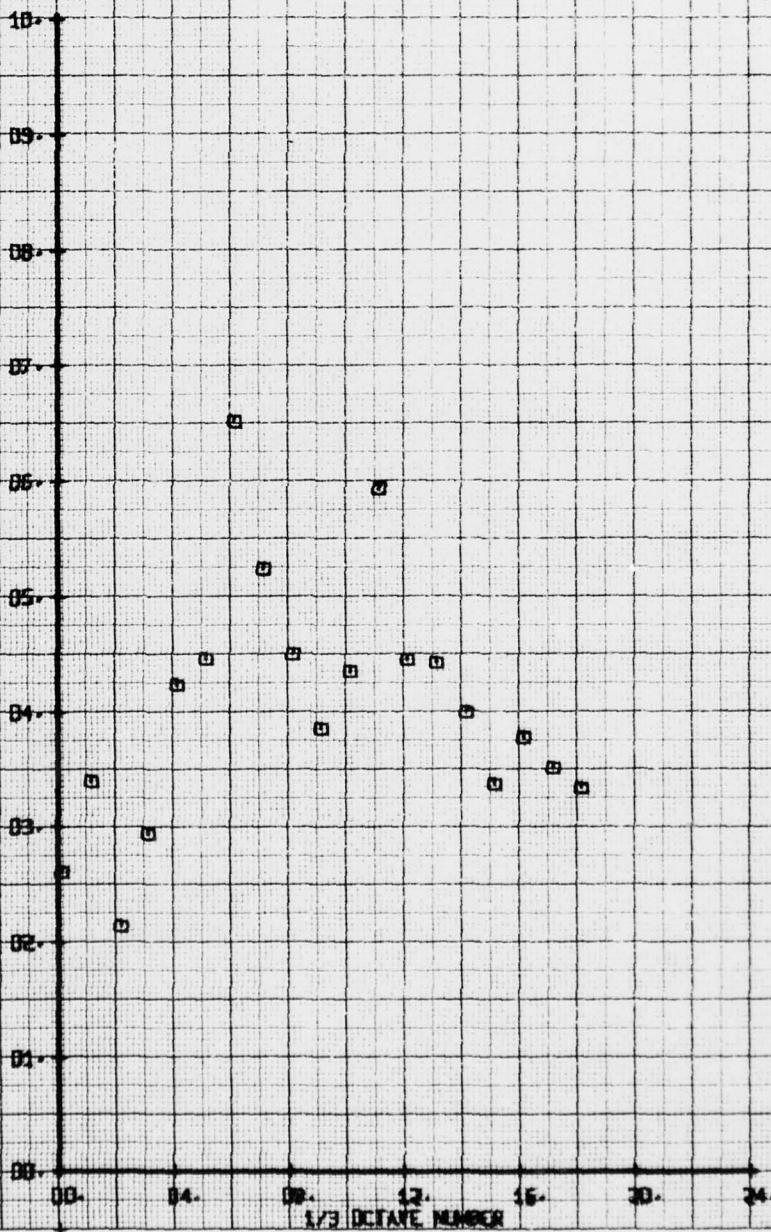
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.1601A-2-17HI- STIFF P-A-
 RUN 153 TP 2

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

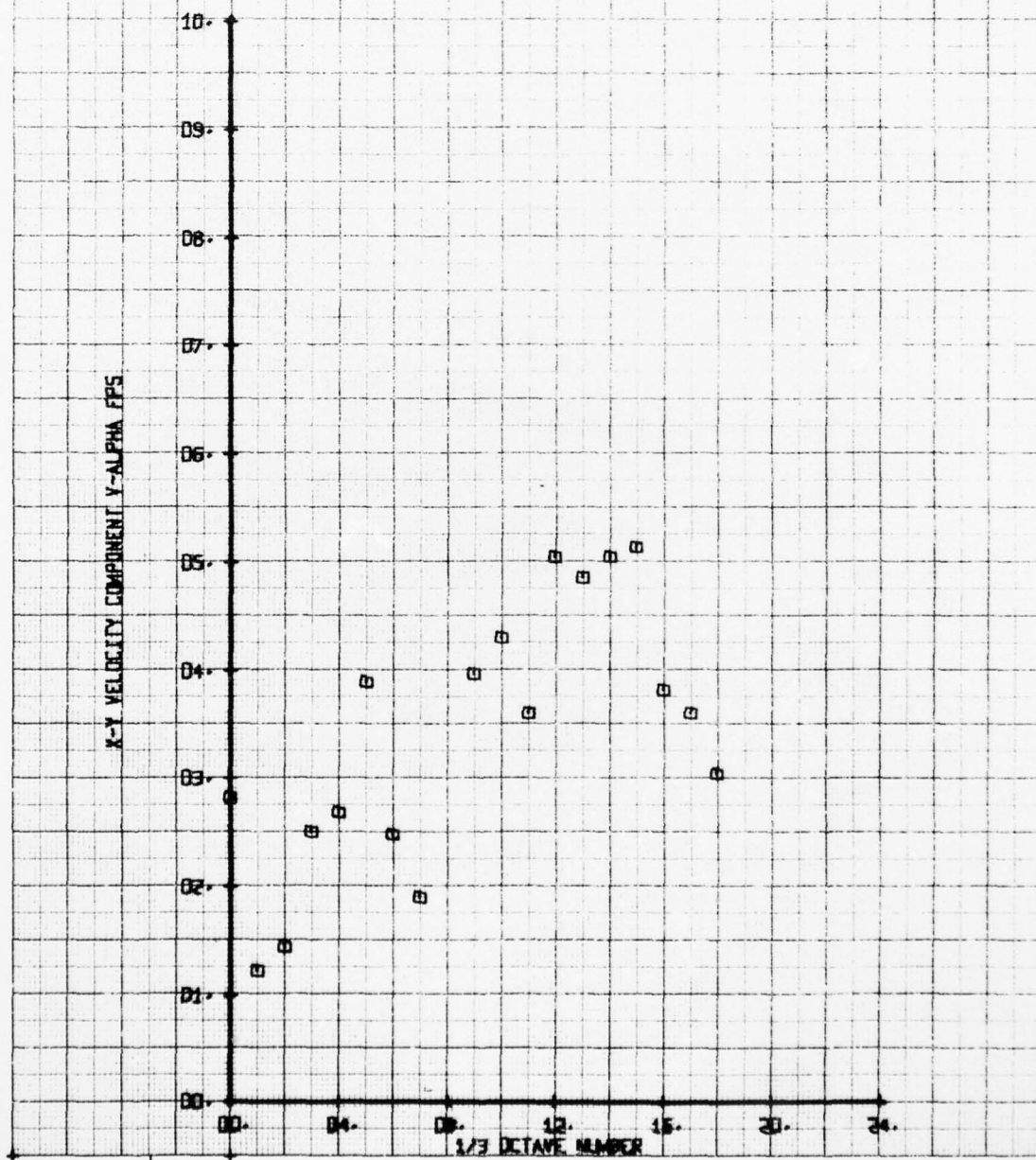
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16DIA-2-17HT- STIFF P-A-
 RUN 153 TP 3

SYN CH PARAMETER
 □ 66 V-ALPHA

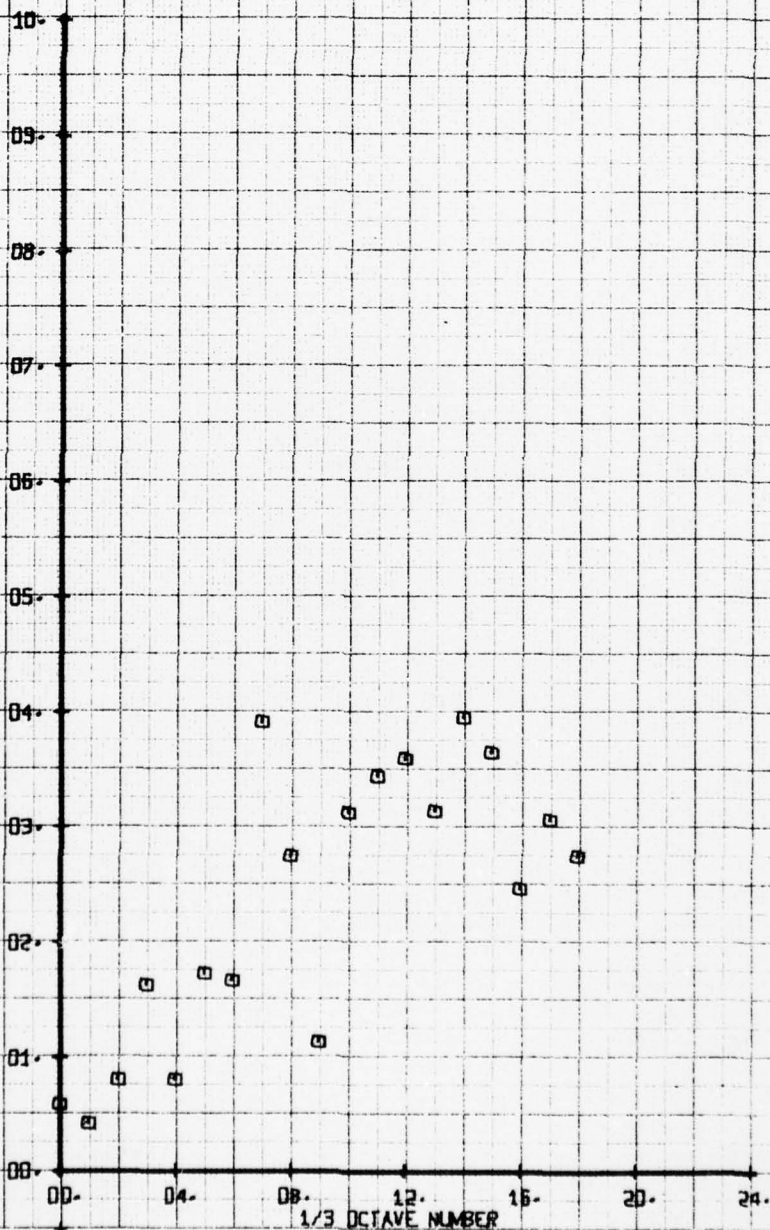
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-1501A-2-17HT- STIFF P-A-
 RUN 153 TP 4

SYN CH PARAMETER
 0 66 V-ALPHA

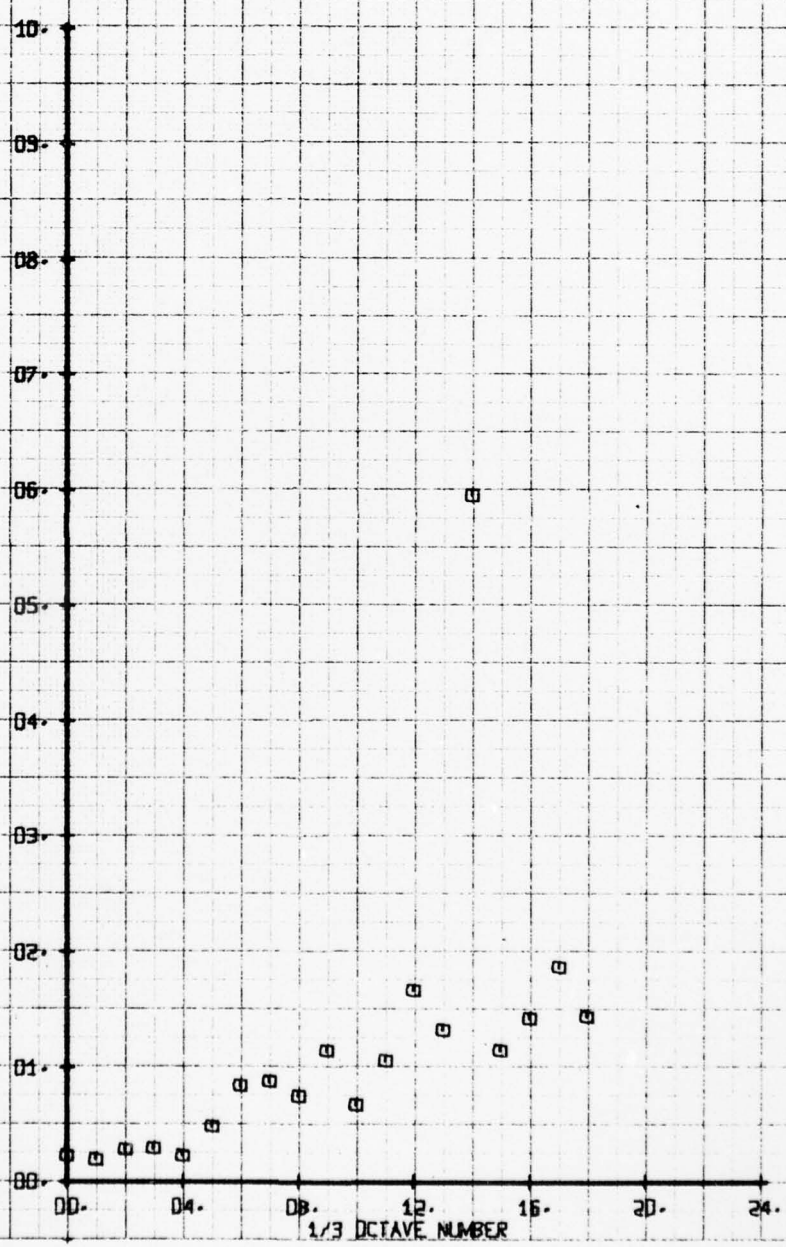
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-1501A-2-17HT- STIFF P-A-
 RUN 153 TP 5

SYM CH PARAMETER
 □ 66 V-ALPHA

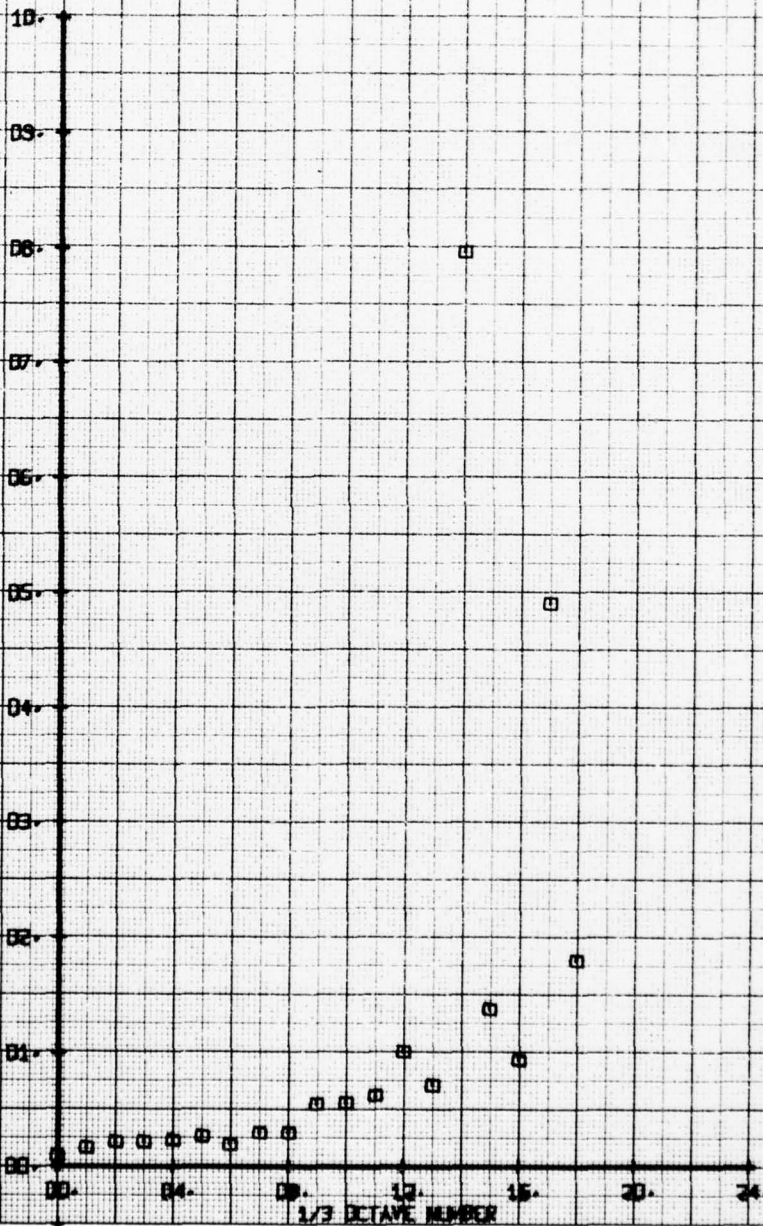
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.15DIA-2.17HT- STIFF P.A.
 RUN 153 TP 6

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

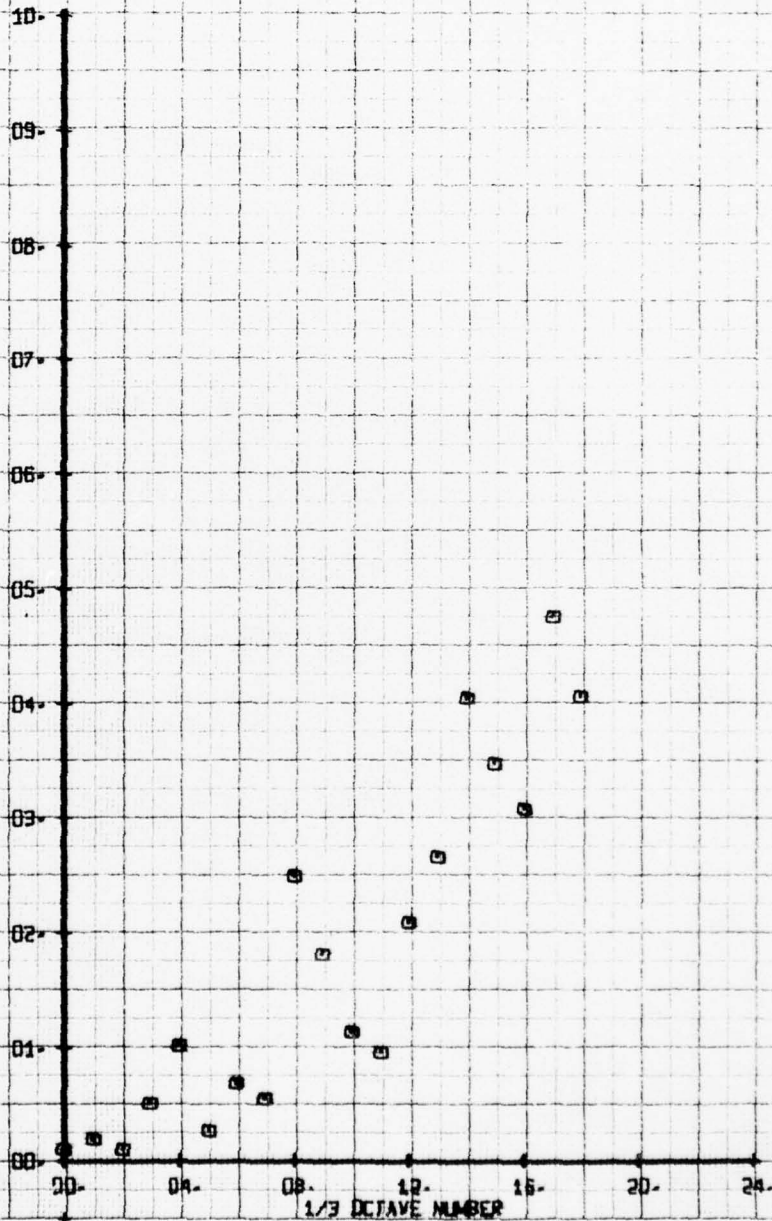
X-Y VELOCITY COMPONENT V-ALPHA PPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-160IA-2-17HT-5TIEF P-A-
 RUN 153 TP 7

LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

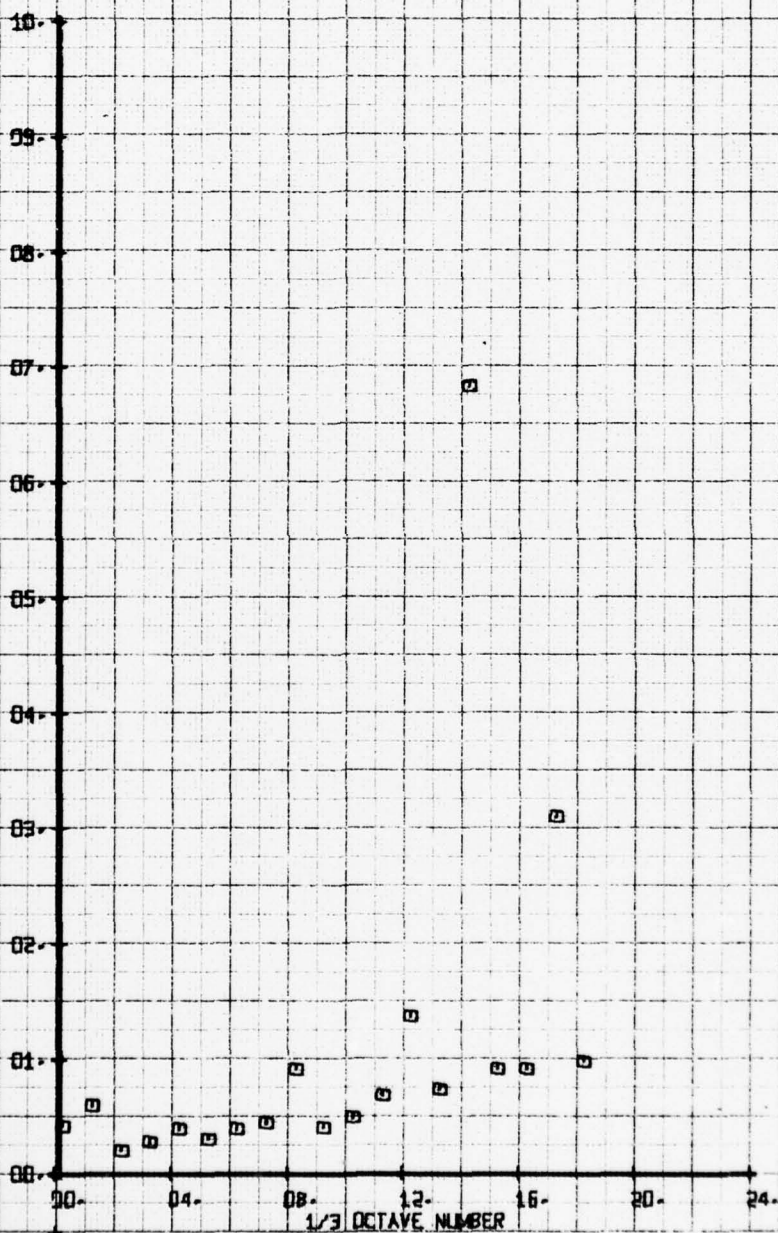
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16 DIA-2-17 HT- STIFF P.A.
 RUN 153 TP 8

LEGEND
 CH 66
 PARAMETER
 V-ALPHA

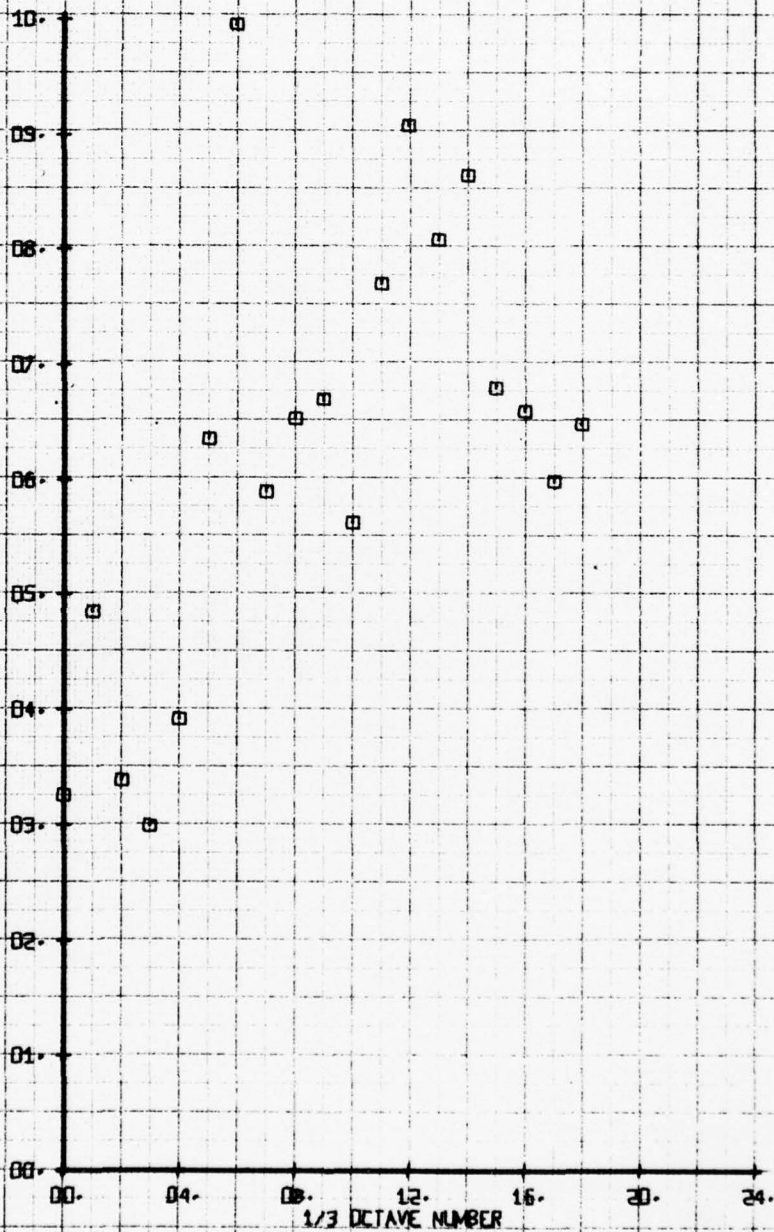
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-15DIA-2-17HT- STIFF P-A-
 RUN 159 TP 2

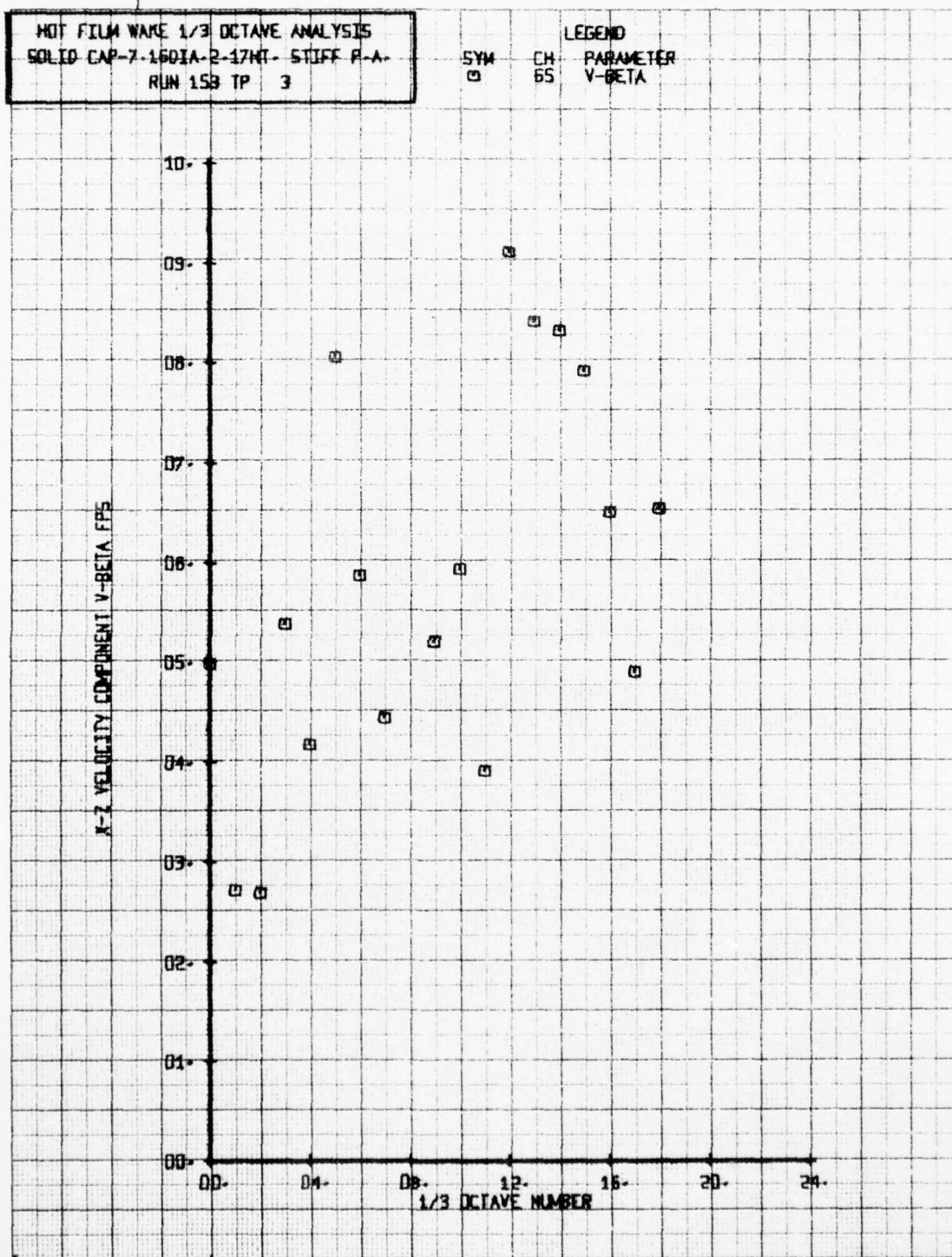
SYM CH PARAMETER
 □ 65 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



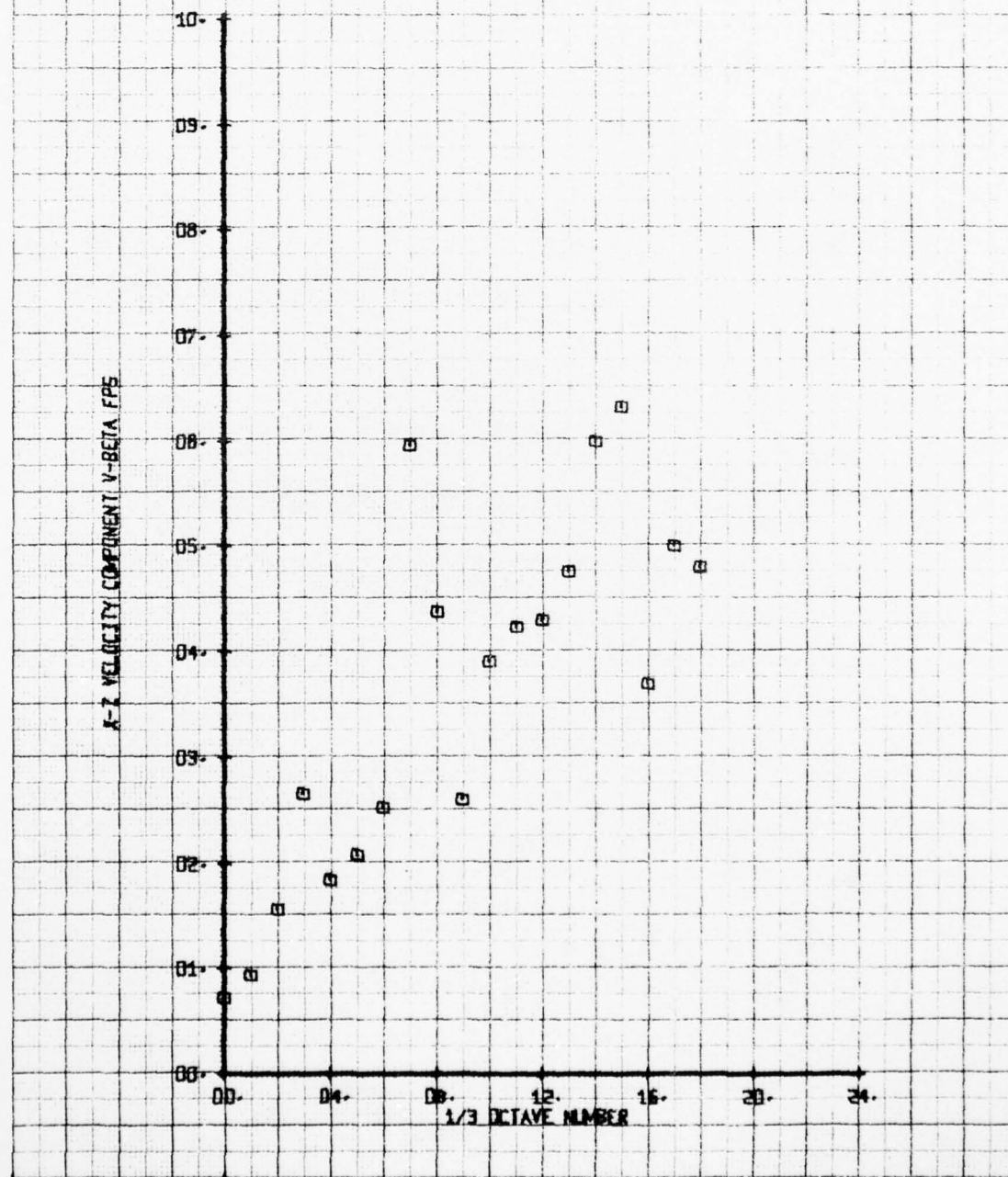
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-1601A-2-17HT- STIFF P-A-
 RUN 158 TP 3

SYN CH PARAMETER
 □ 65 V-BETA



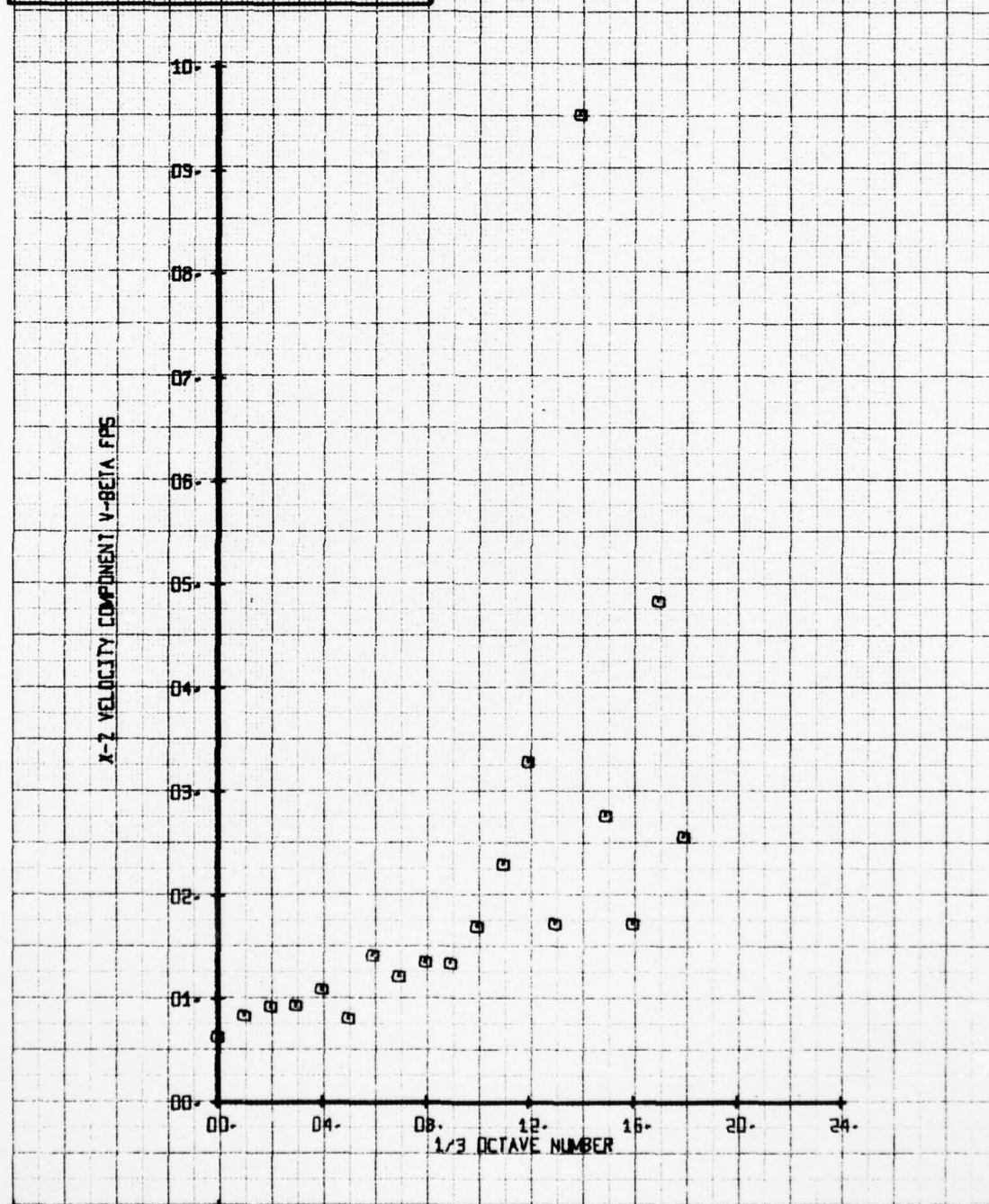
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-160IA-2-17MT- STIFF P-A-
 RUN 158 TP 4

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-1501A-2-17HT- STIFF P.A.
 RUN 158 TP 5

SYN CH PARAMETER
 □ 65 V-BETA



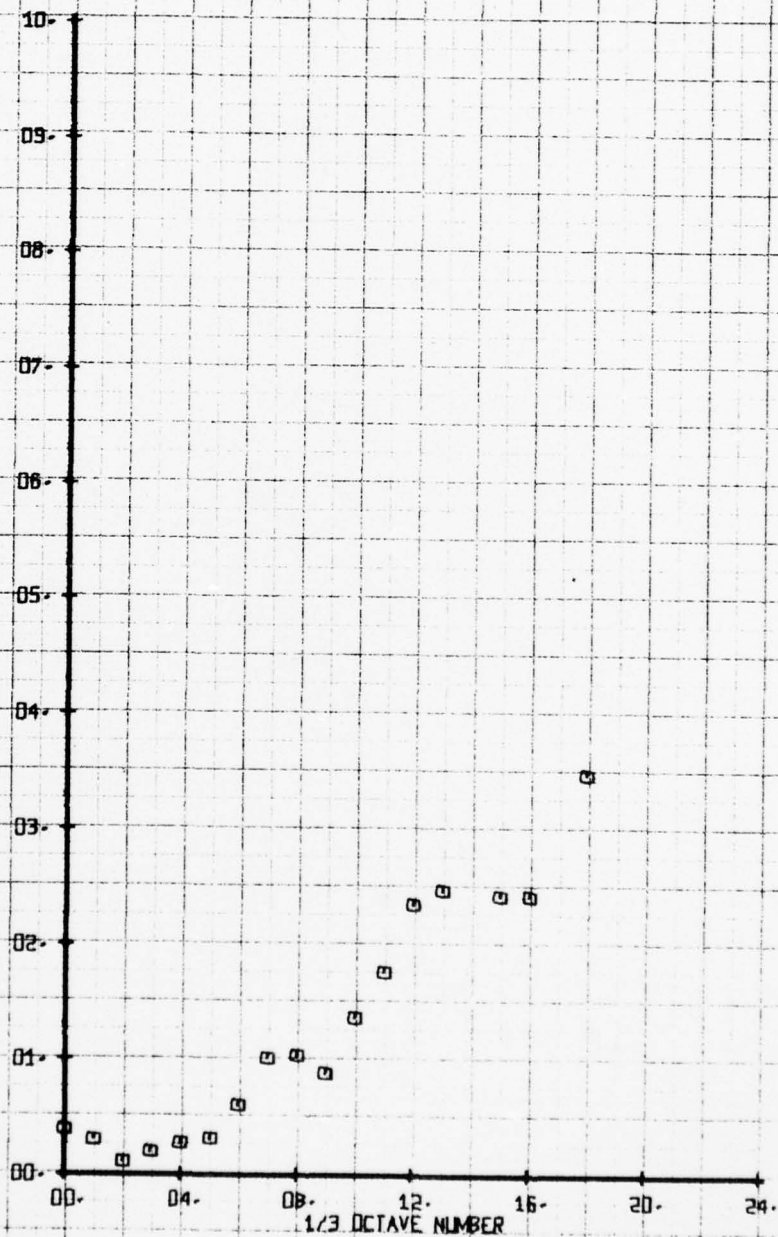
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-16DIA-2-17HT- STIFF R-A-
 RUN 158 TP 6

SYM
 □

CH
 65

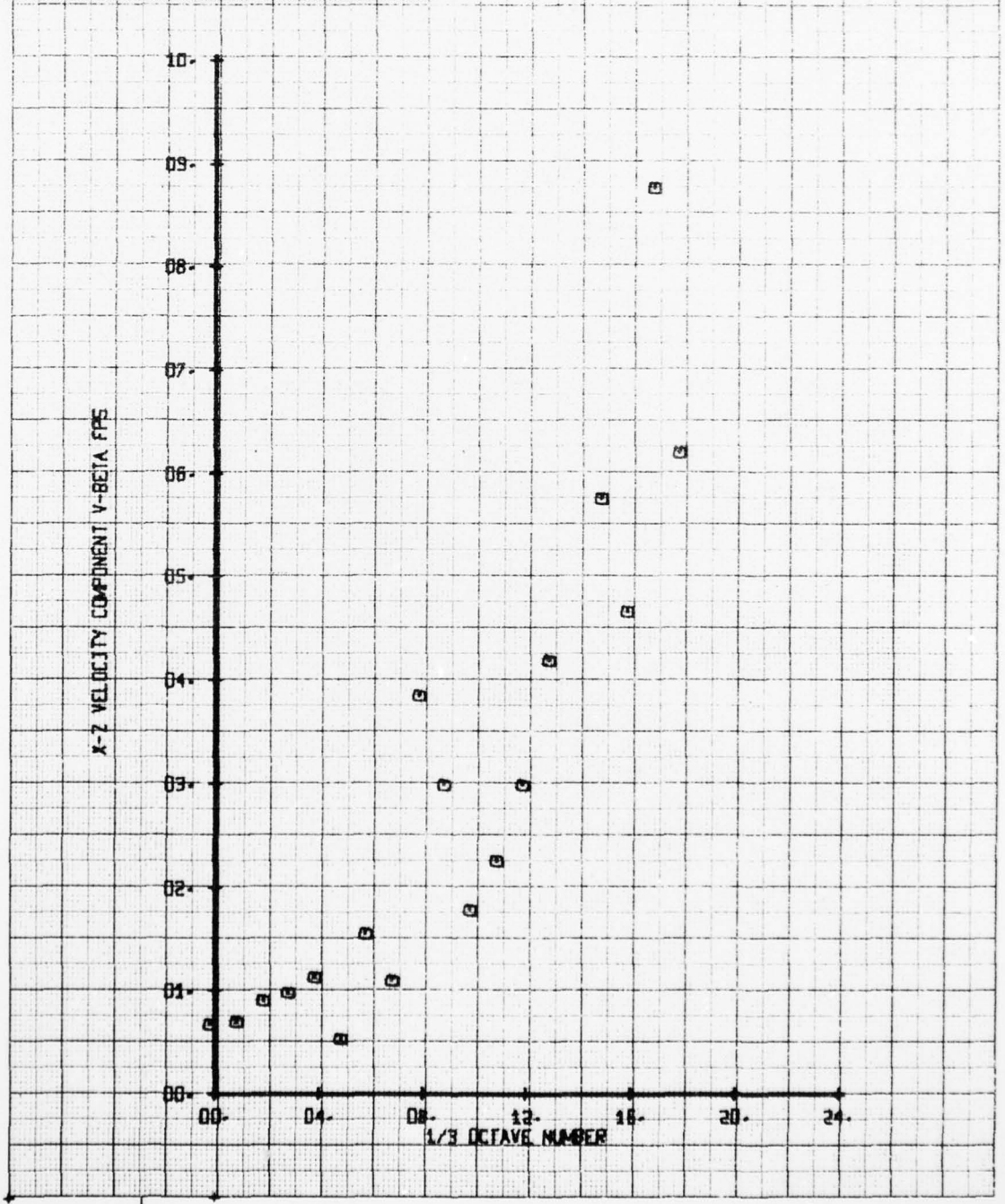
LEGEND
 PARAMETER
 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS



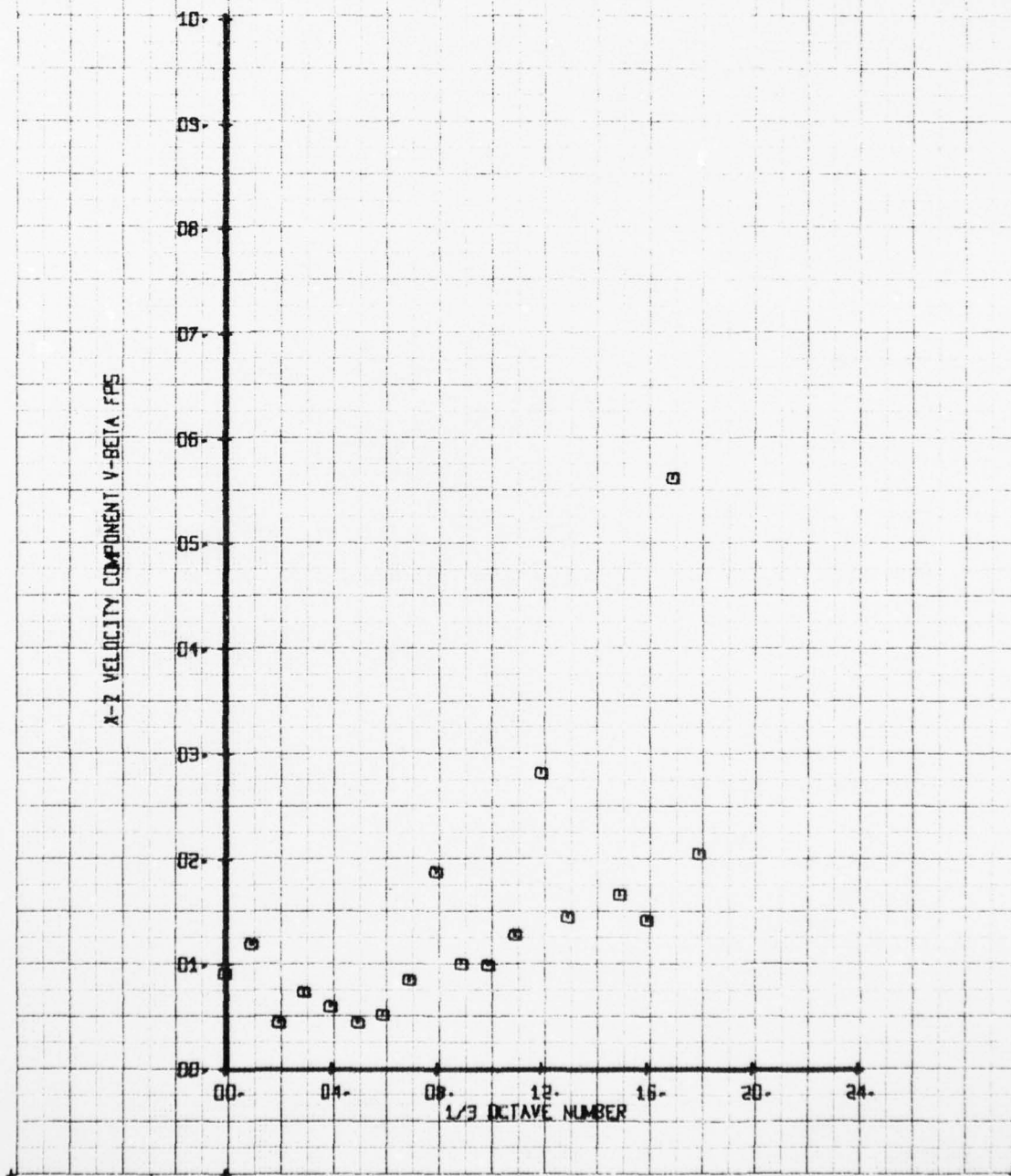
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7-160IA-2-17HT- STIFF P.A.
 RUN 153 TP 7

SYM	CH	LEGEND
□	65	PARAMETER V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOLID CAP-7.16DIA-2.17HT- STIFF P-A-
 RUN 153 TP 8

SYN CH PARAMETER
 □ 65 V-BETA



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF1--ETC(U)
SEP 78 P F SHERIDAN

F/G 20/4

DAAJ02-77-C-0020

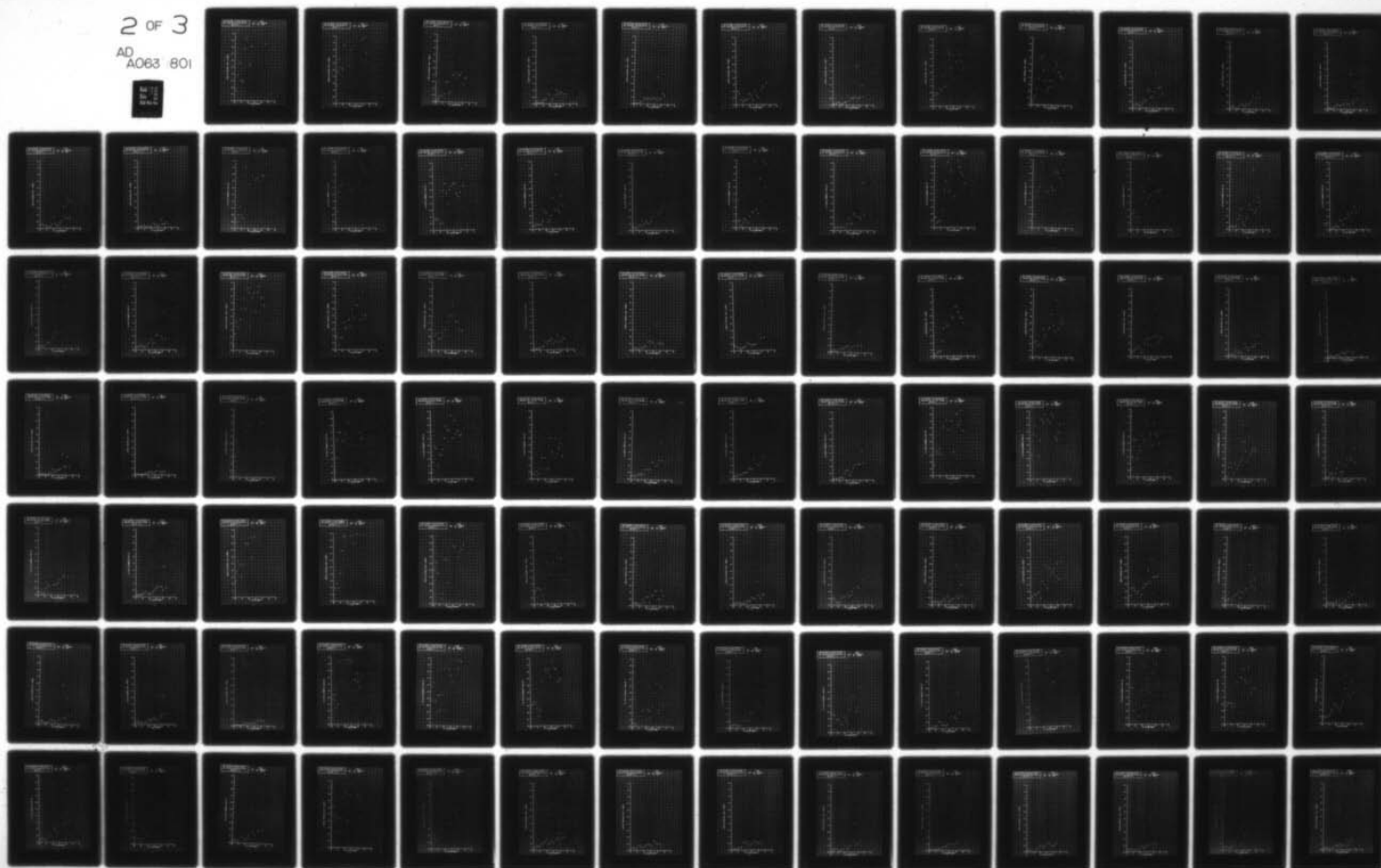
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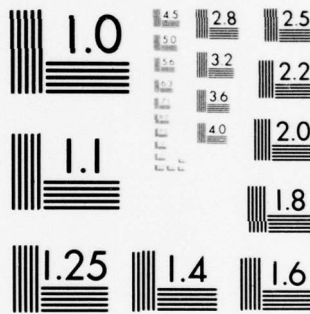
NL

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2 OF 3

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A063 801

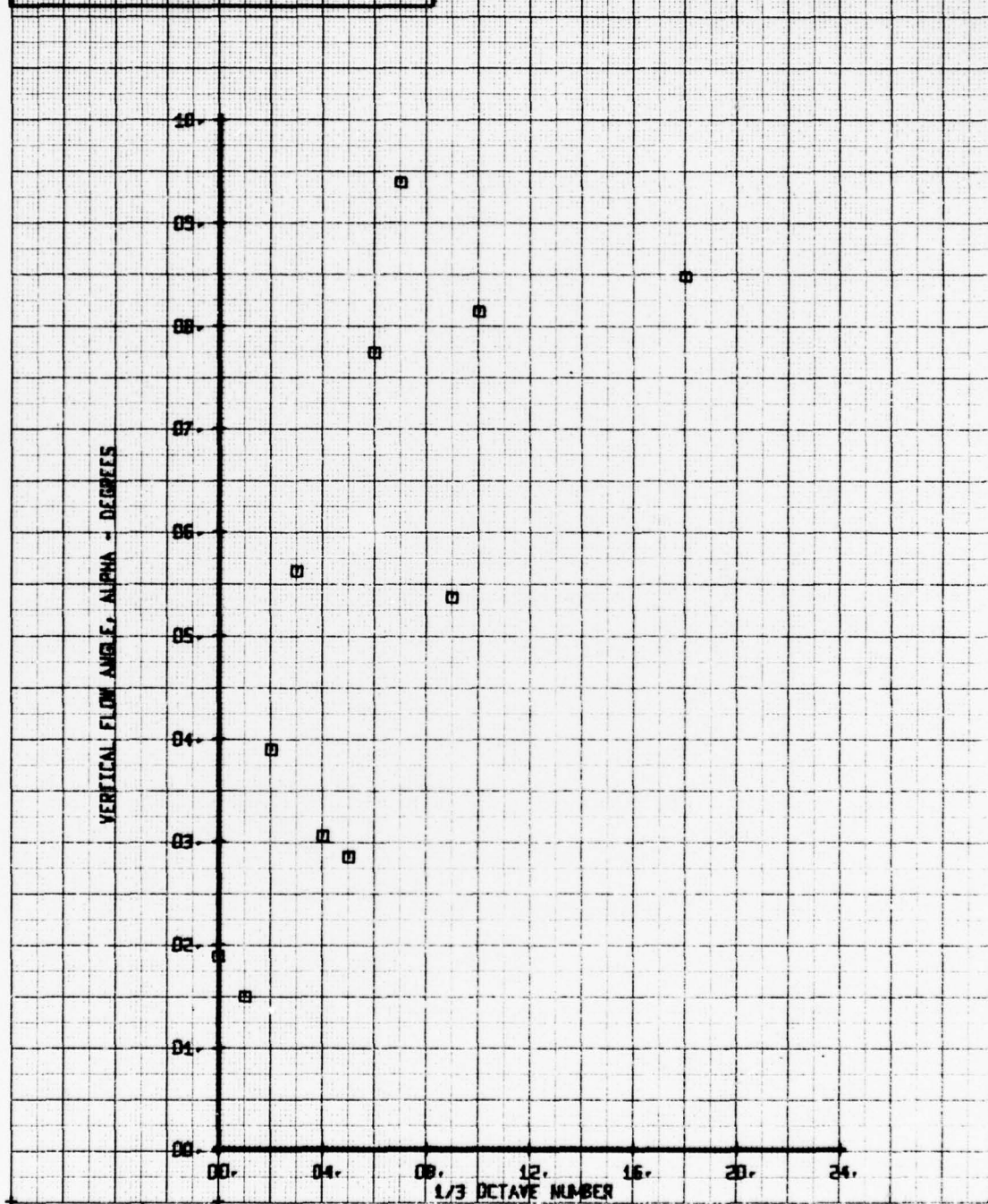


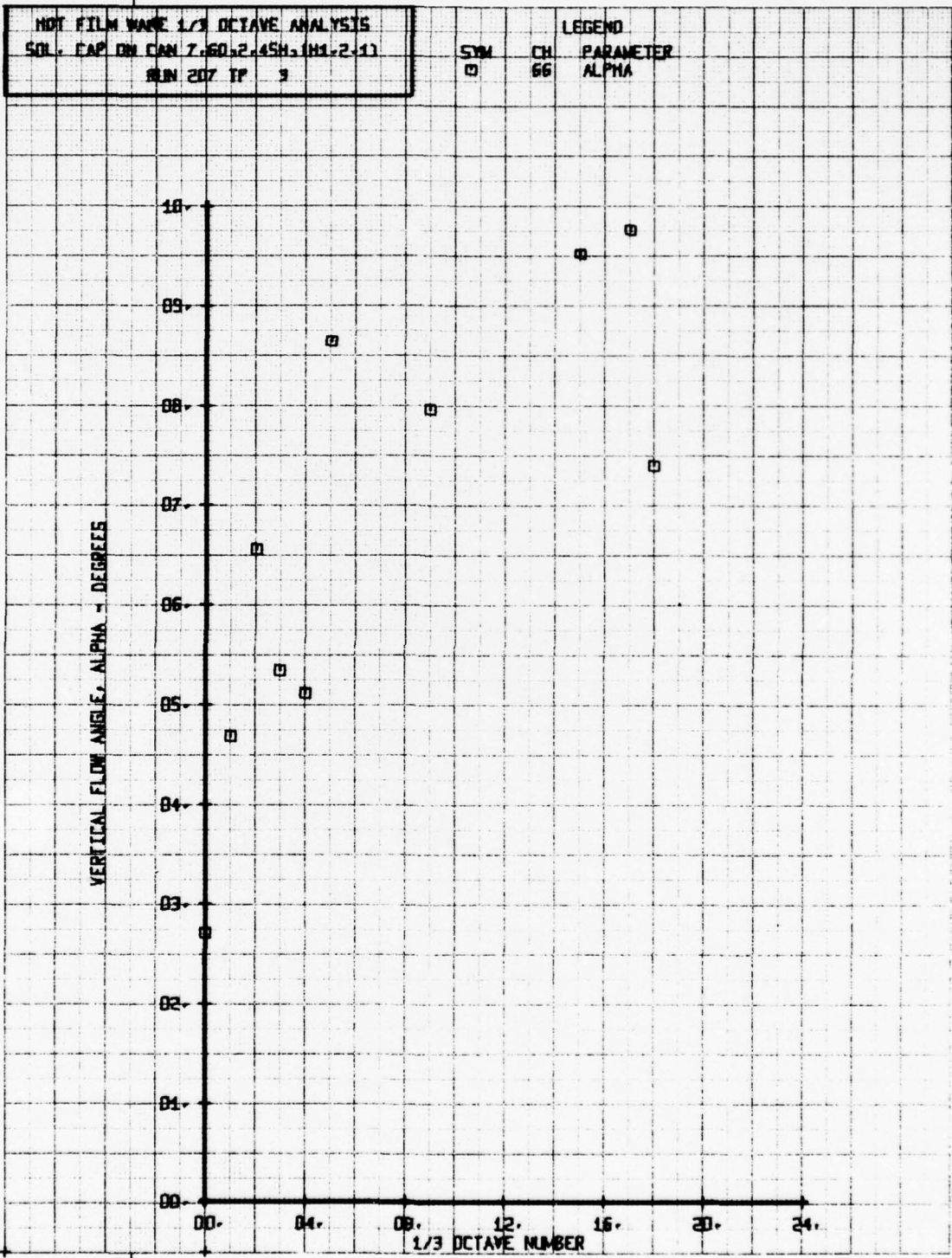


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60, 2.45H, (H1-2.1)
 RUN 207 TP 2

LEGEND
 CH 66
 PARAMETER
 ALPHA





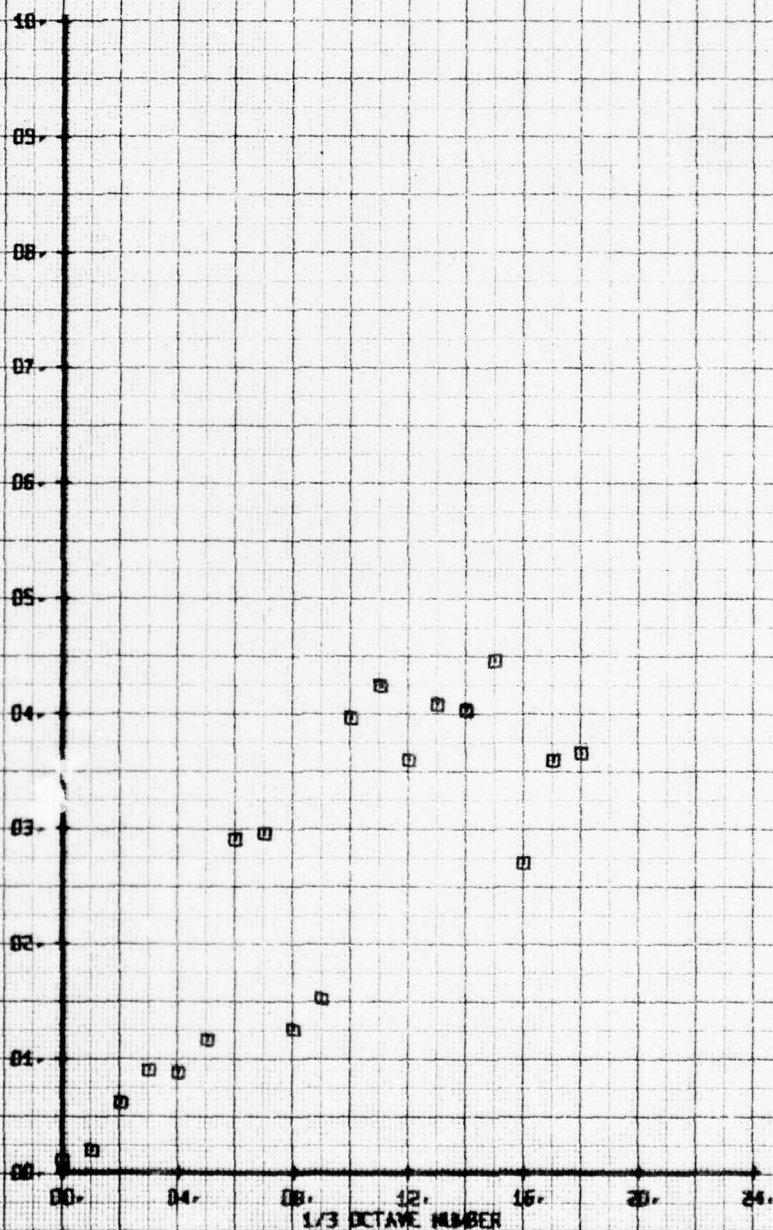
NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-2-45H, (H1-2-1)
 RUN 207 TP 4

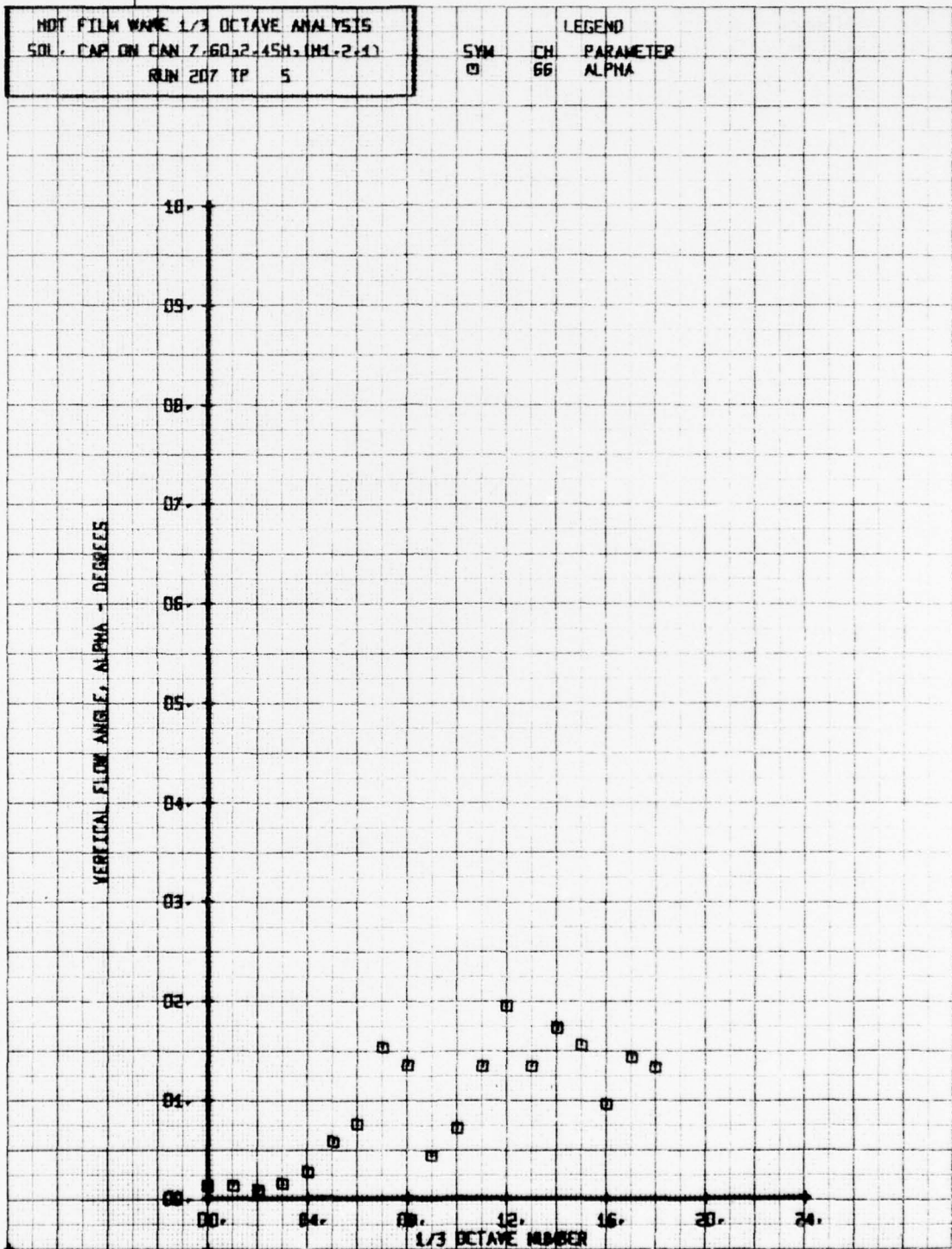
SYM
 0

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

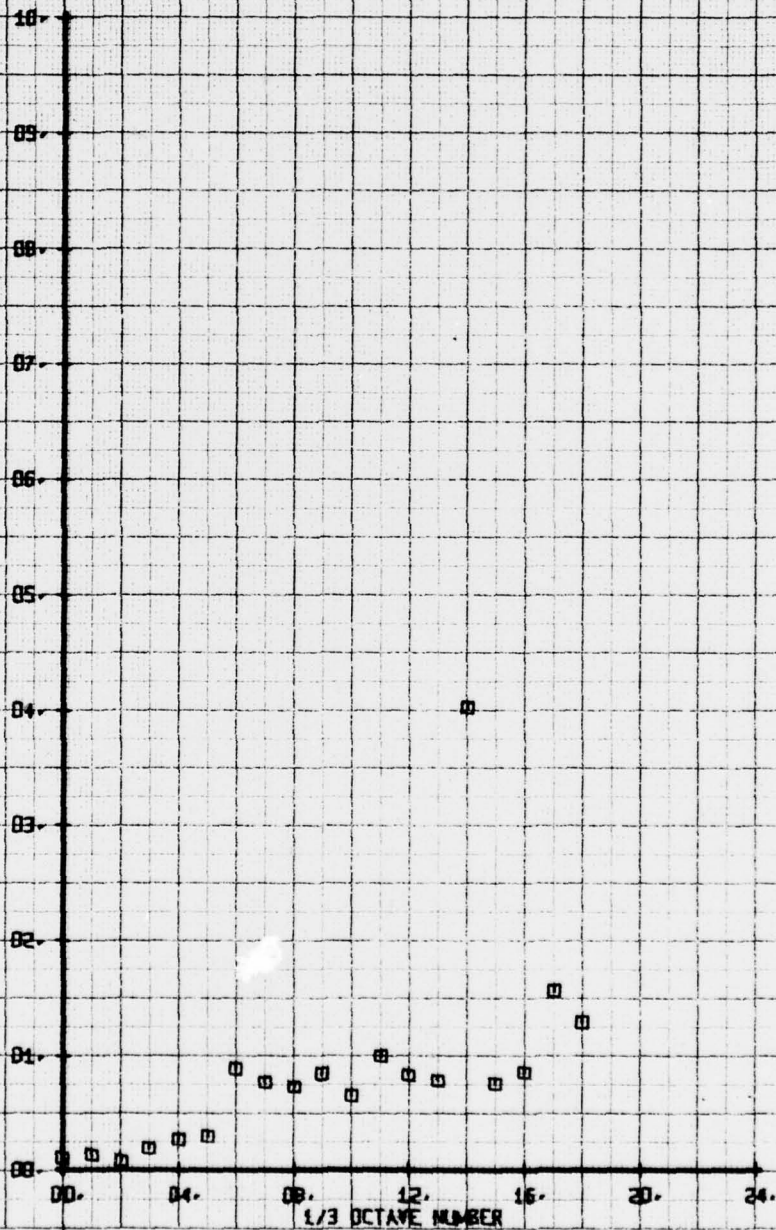


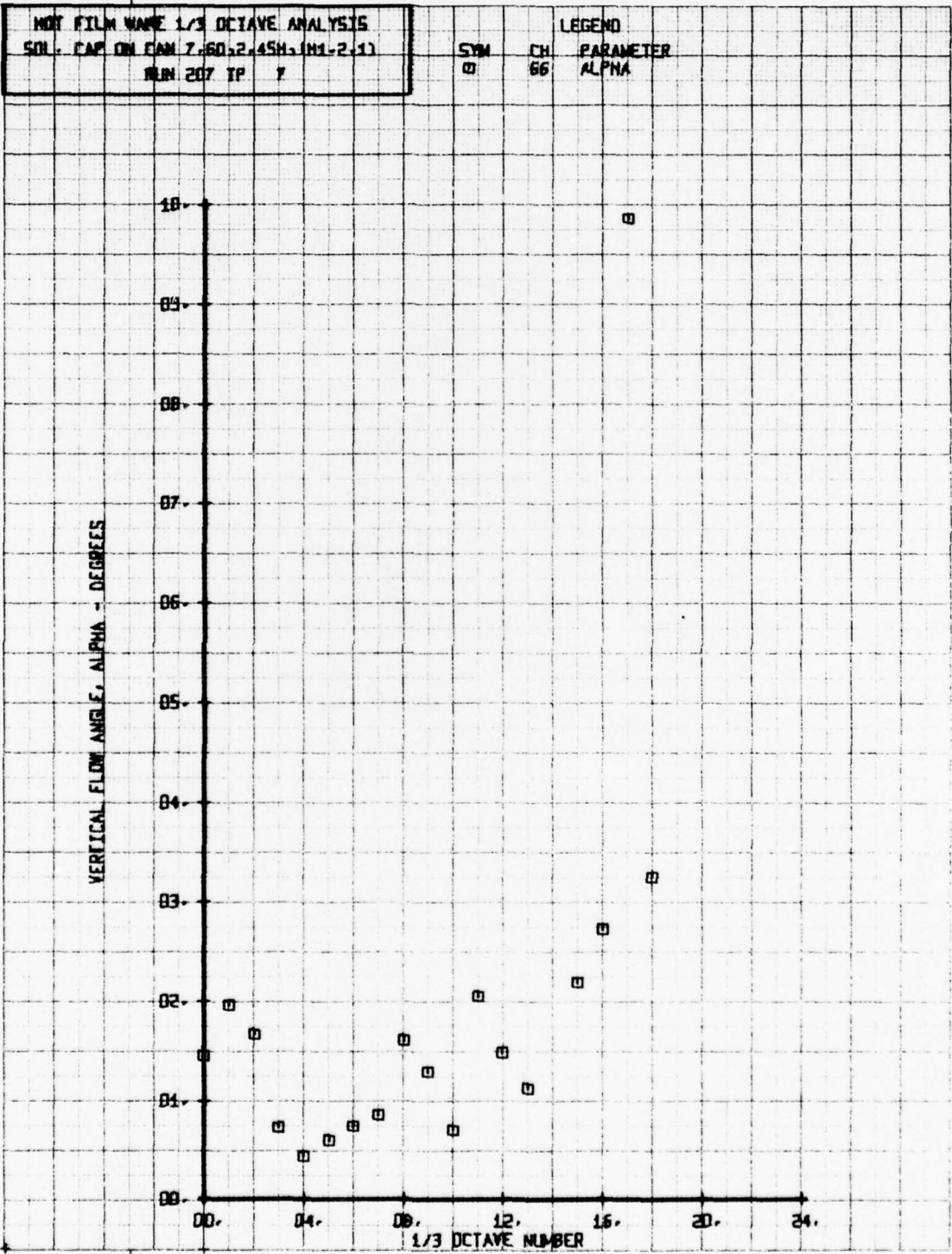


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SON. CAP ON CAN 7.60, 2.45H, 1H1-2.11
 RUN 207 YP 5

LEGEND
 CH 66
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

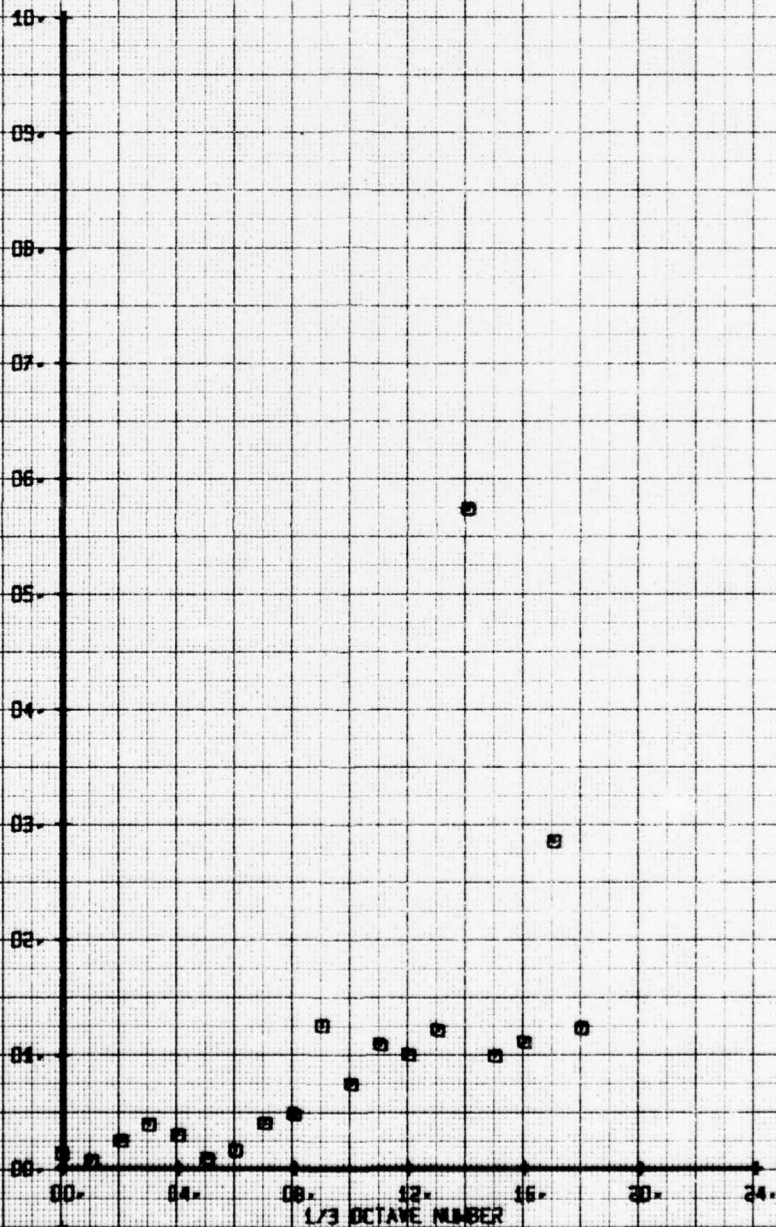




NOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.6052.45M. (M1.2.1)
 RUN 207 TP B

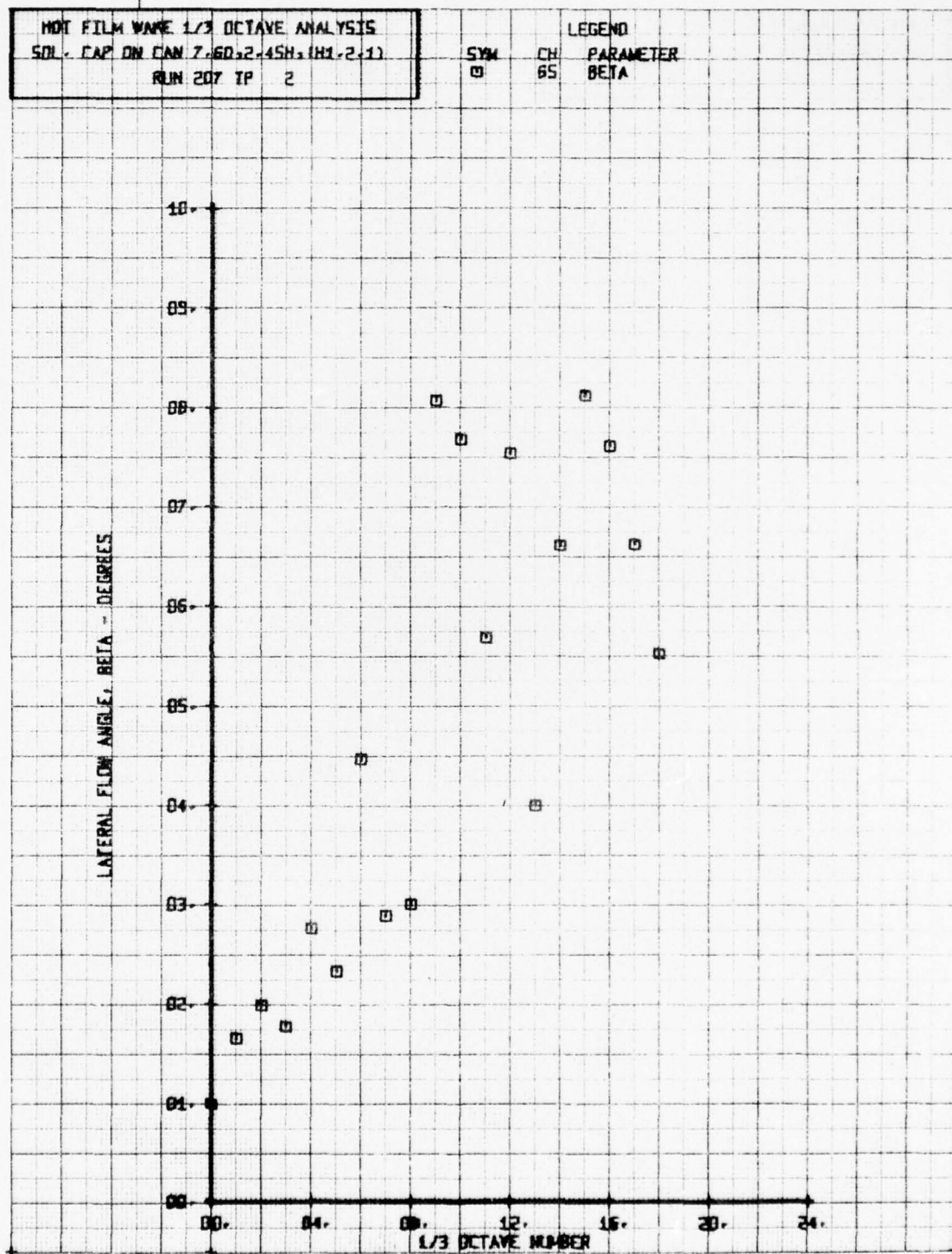
LEGEND
 SYM CH PARAMETER
 0 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



MORT FILM WAVE 1/3 OCTAVE ANALYSIS
 SDI - CAP ON CAN 7.60x2.45H (H1.2.1)
 RUN 207 TP 2

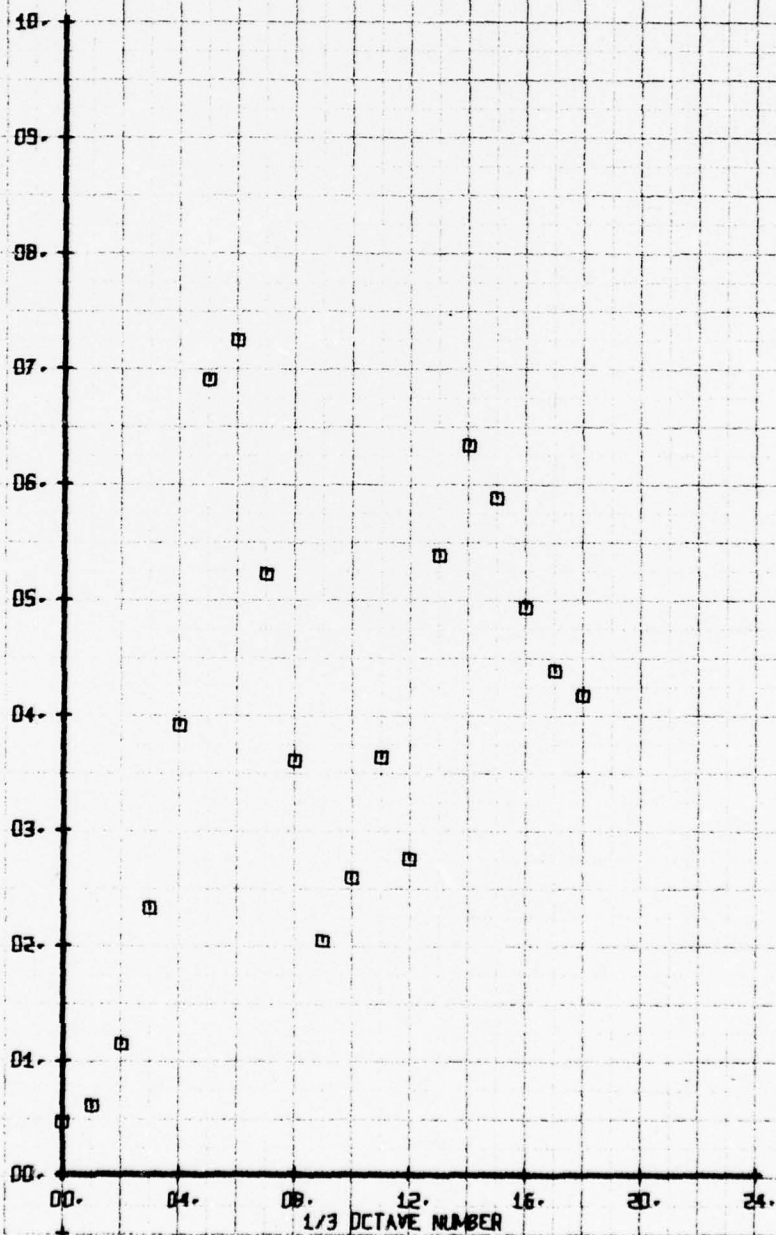
SYM	CH	PARAMETER
□	65	BETA



HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60x2.45N₂(N1-2.1)
 RUN 207 TP 9

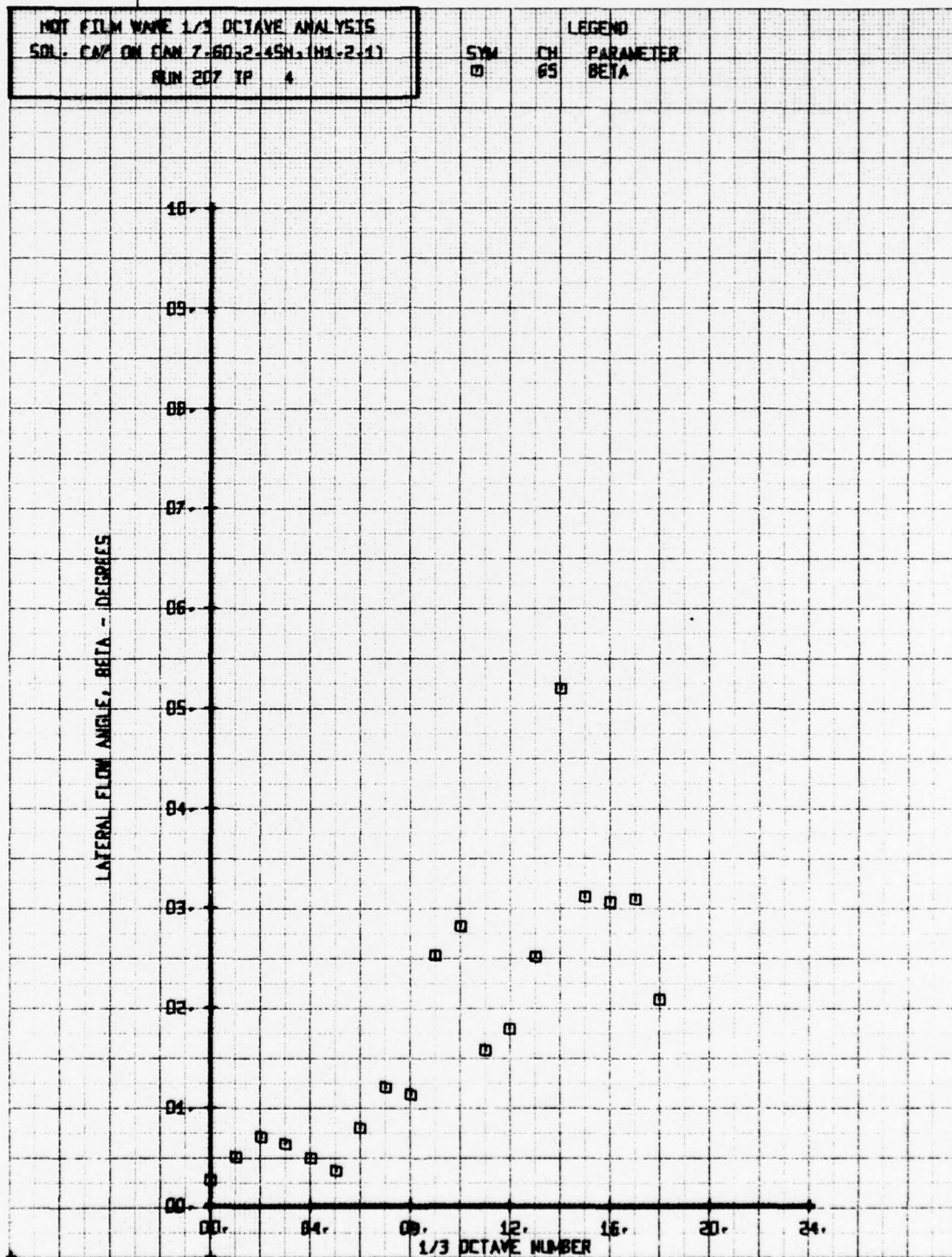
SYM CH PARAMETER
 □ 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-2-45N. (H1-2-1)
 RUN 207 YP 4

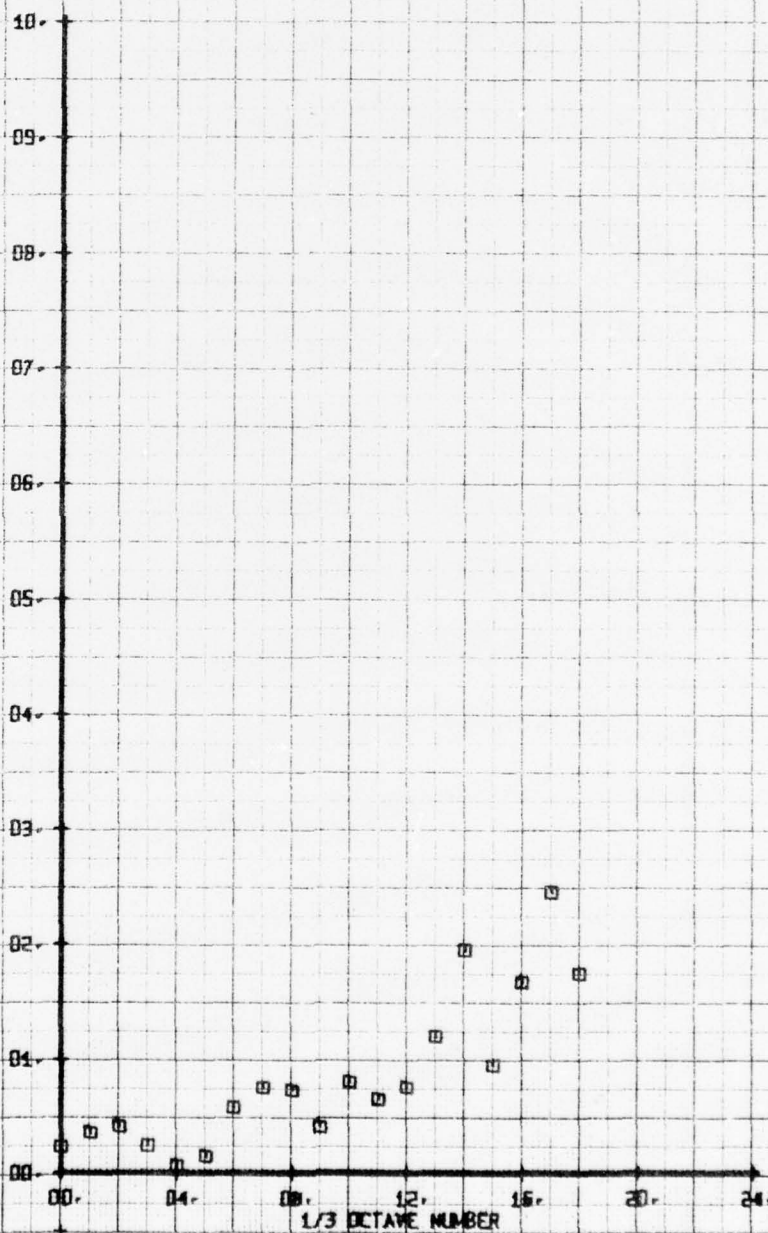
SYM	CH	PARAMETER
□	65	BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ON CAN 7-605245H₂ (H1-2-1)
 RUN 207 TP 5

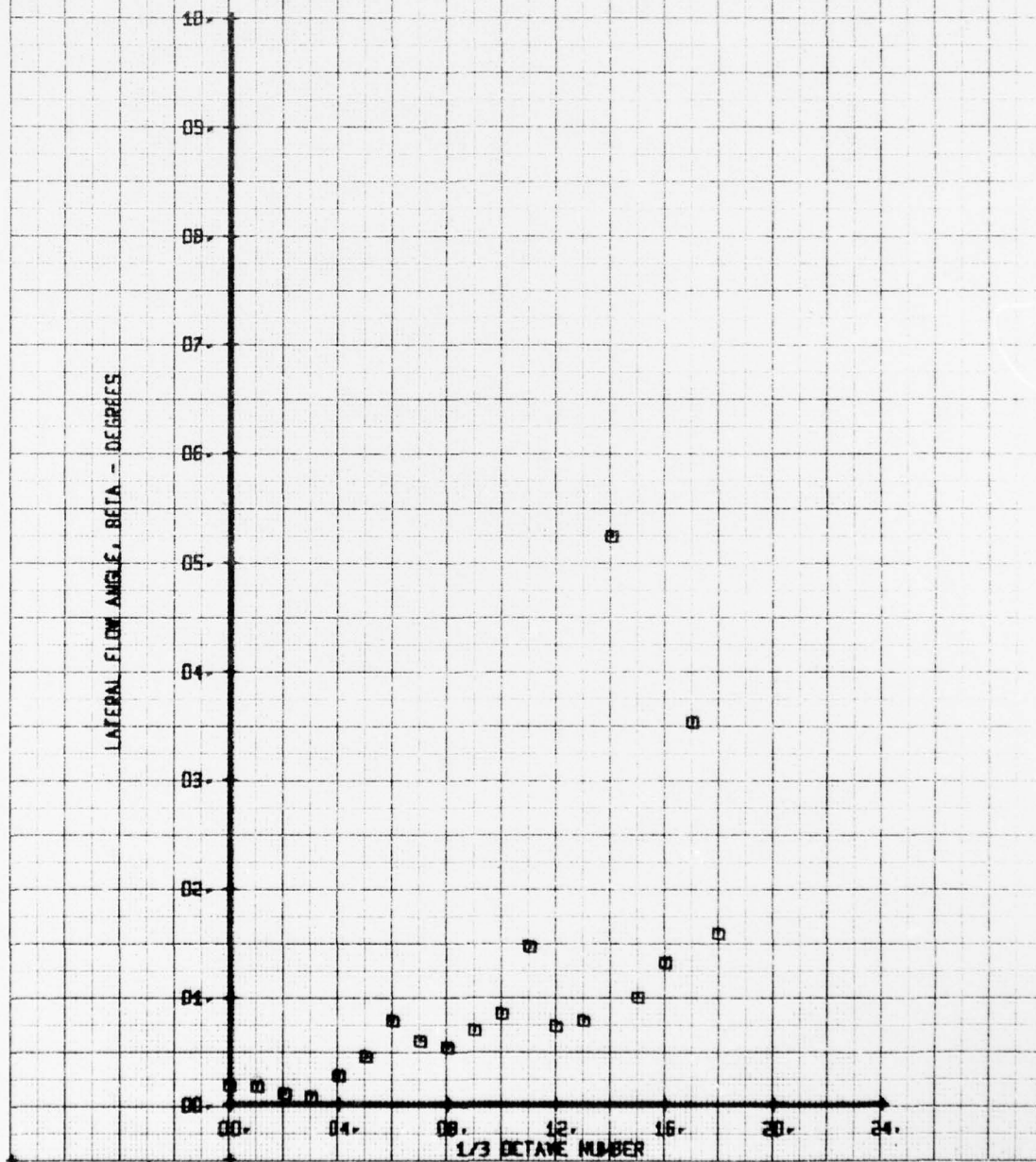
LEGEND		
SYM	CH	PARAMETER
□	65	BETA

LATERAL FLOW ANGLE, BETA - DEGREES



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-2-45H (M1-2-1)
 RUN 207 TP 6

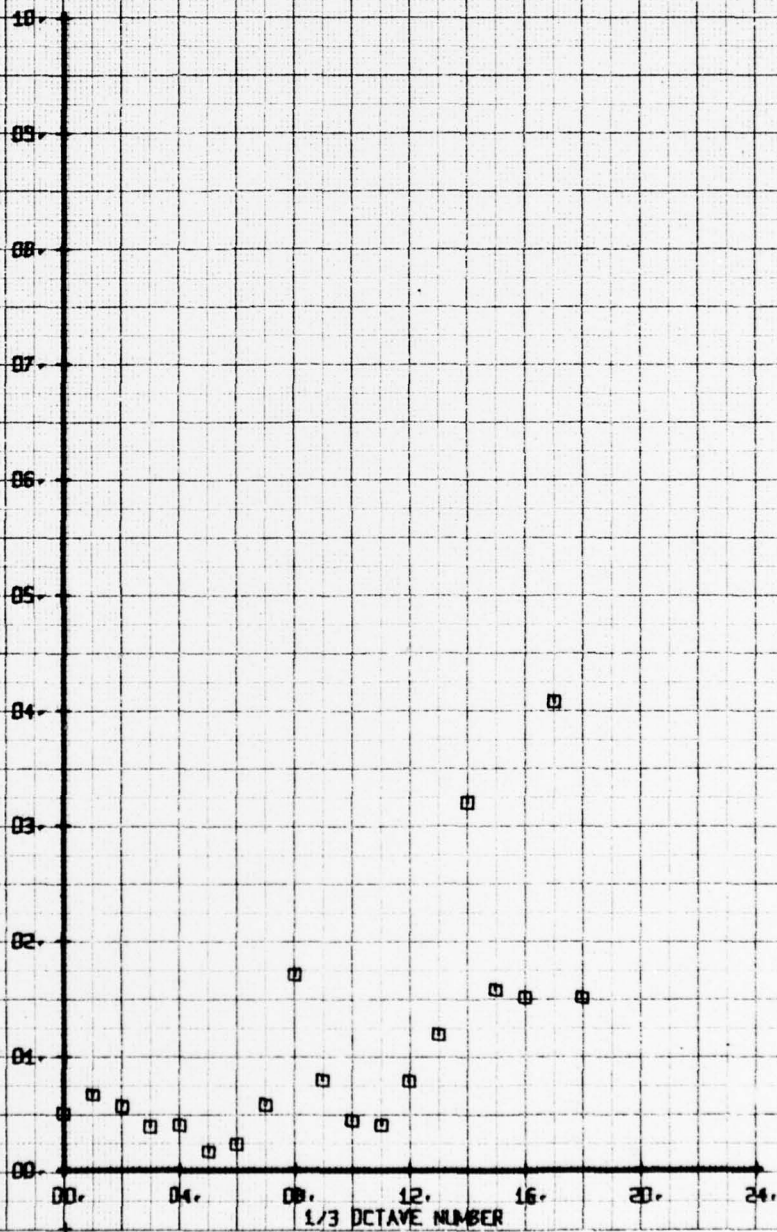
SYM CH PARAMETER
 0 65 BETA

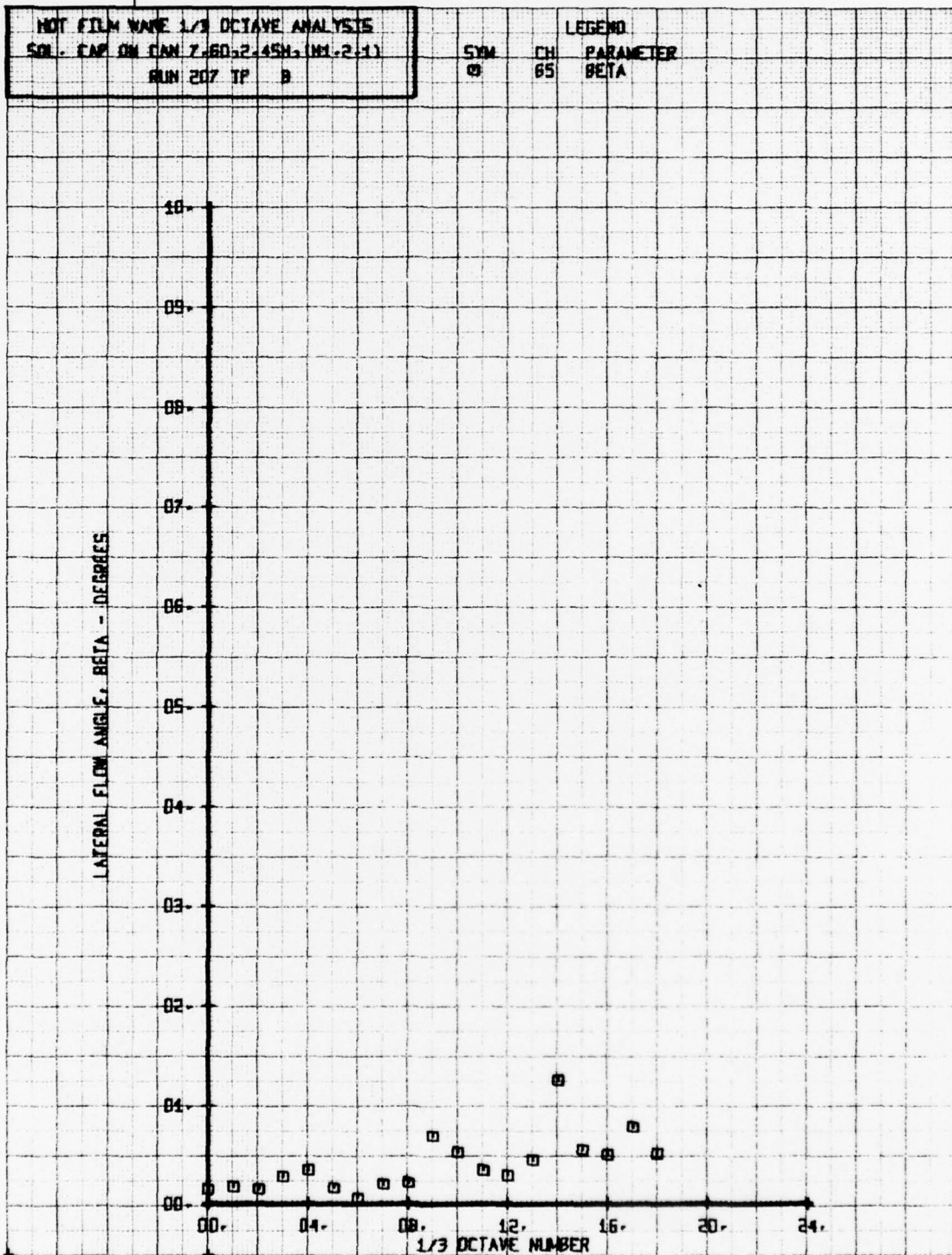


NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON FAN 7.60, 2.45H, (H1-2.1)
 RUN 207 TP. 7

SYM	CH	LEGEND
□	65	PARAMETER BETA

LATERAL FLOW ANGLE, BETA - DEGREES

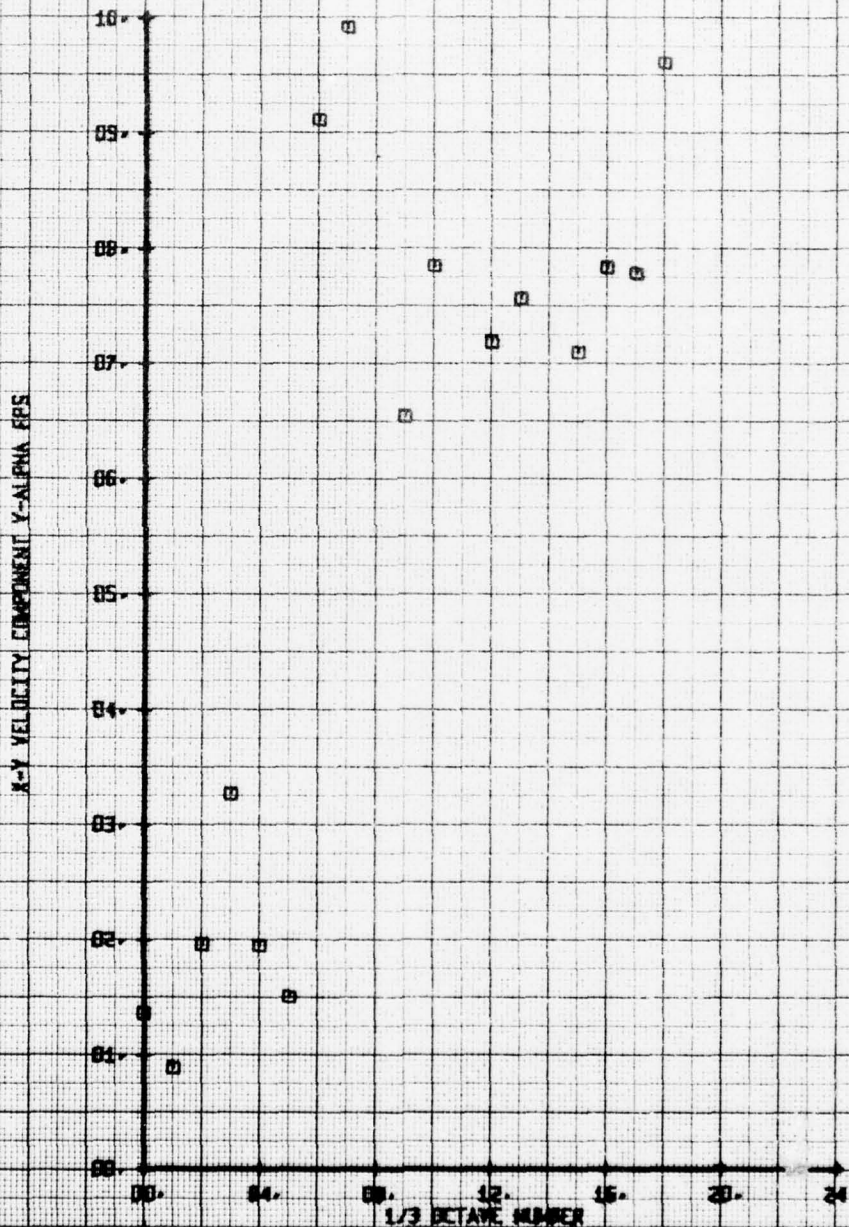




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60, 2.45H, (H1, 2, 1)
 RUN 207 TP 2

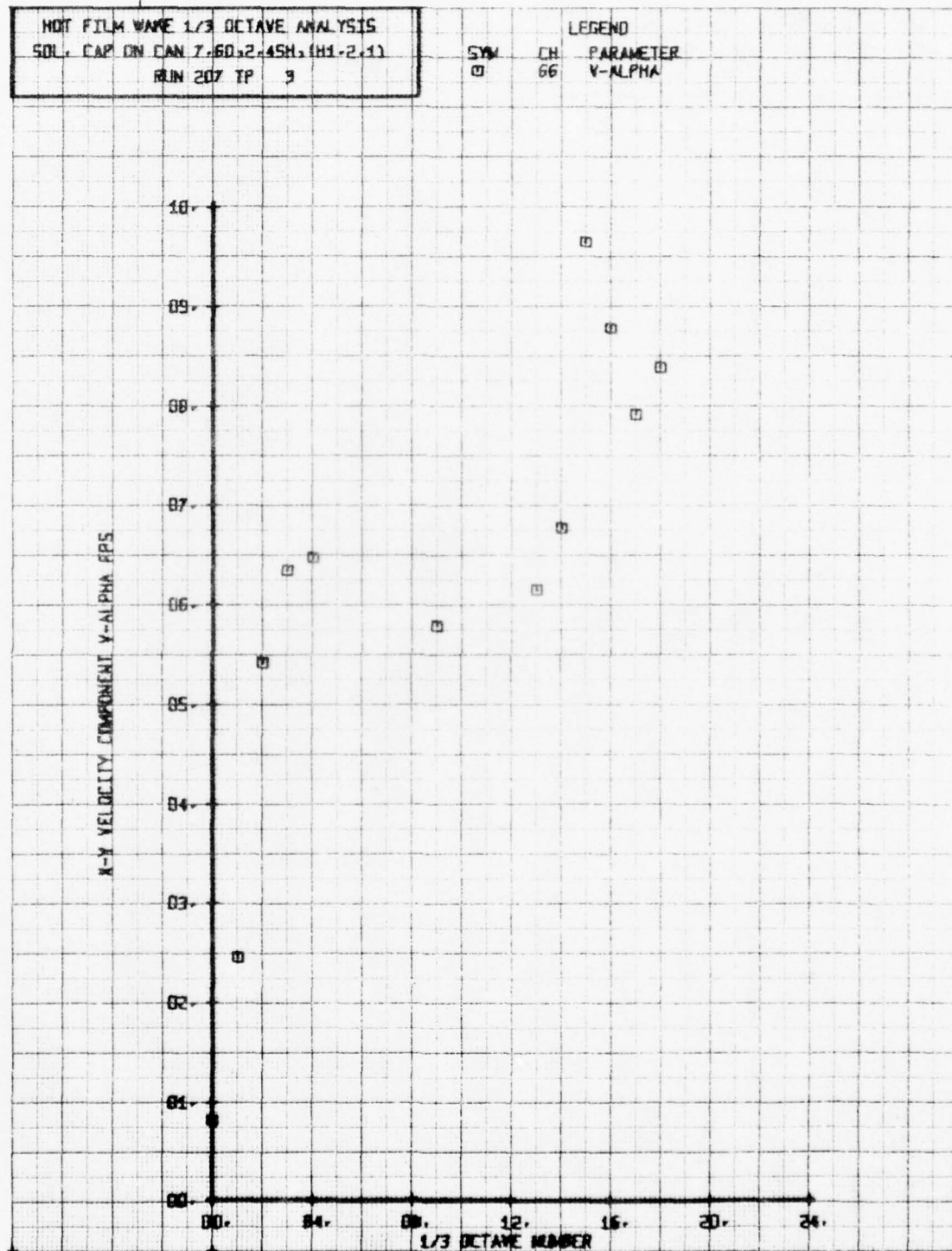
LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

K-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-2-45H (H1-2.1)
 RUN 207 TP 3

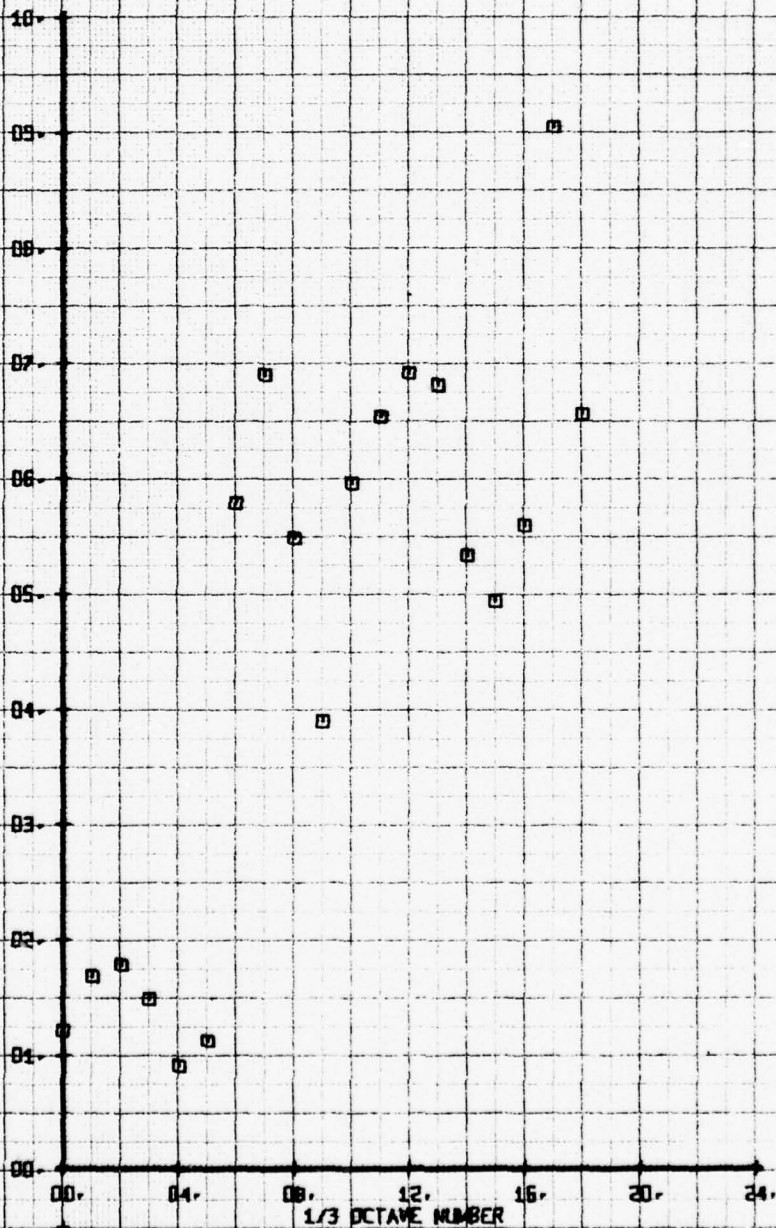
SYM	CH	PARAMETER
□	66	V-ALPHA



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60x2.45H.1M.2.17
 RUN 207 TP 4

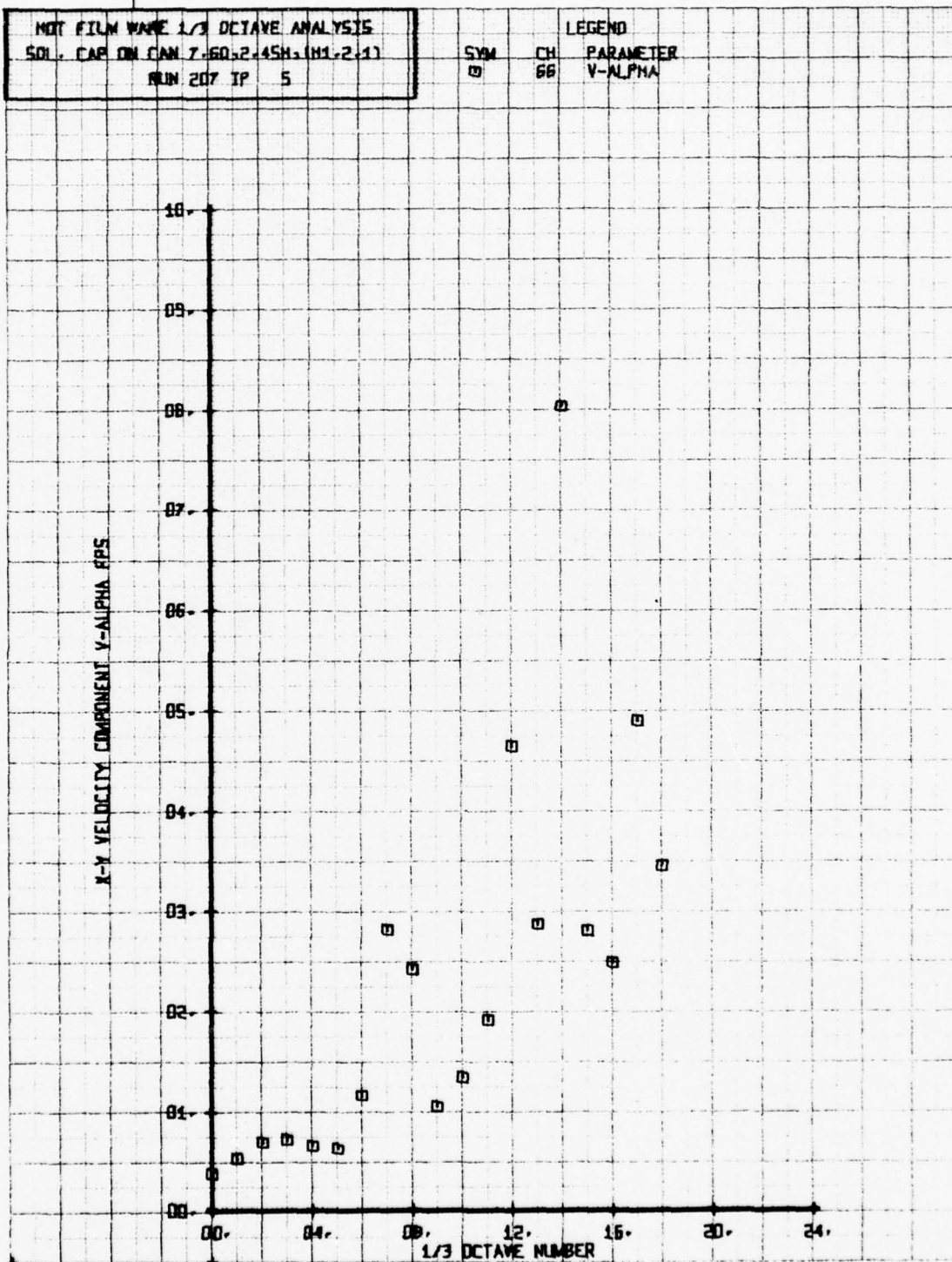
LEGEND
 CH PARAMETER
 66 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60.2.45H. (H1.2.1)
 RUN 207 TP 5

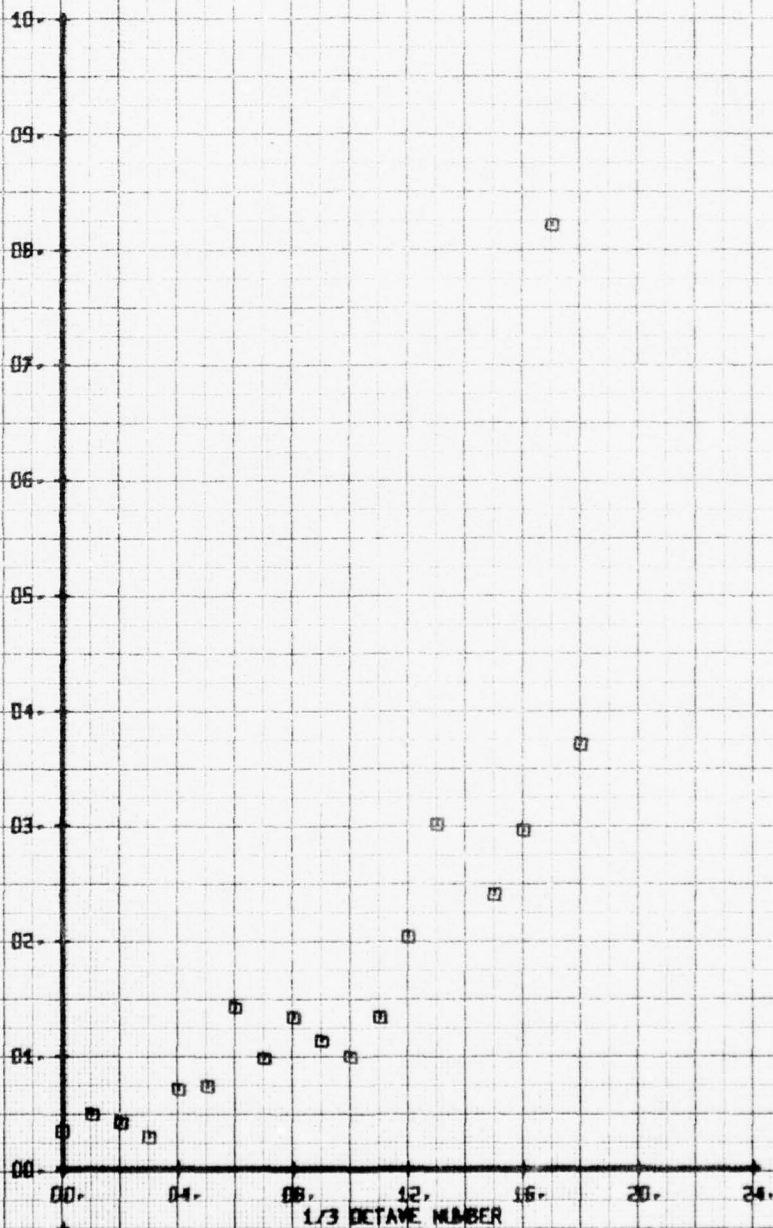
SYN CH
 0 66
 PARAMETER
 V-ALPHA



HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-602-45H (H1-2-1)
 RUN 207 TP 6

SYM	CH	PARAMETER
□	66	V-ALPHA

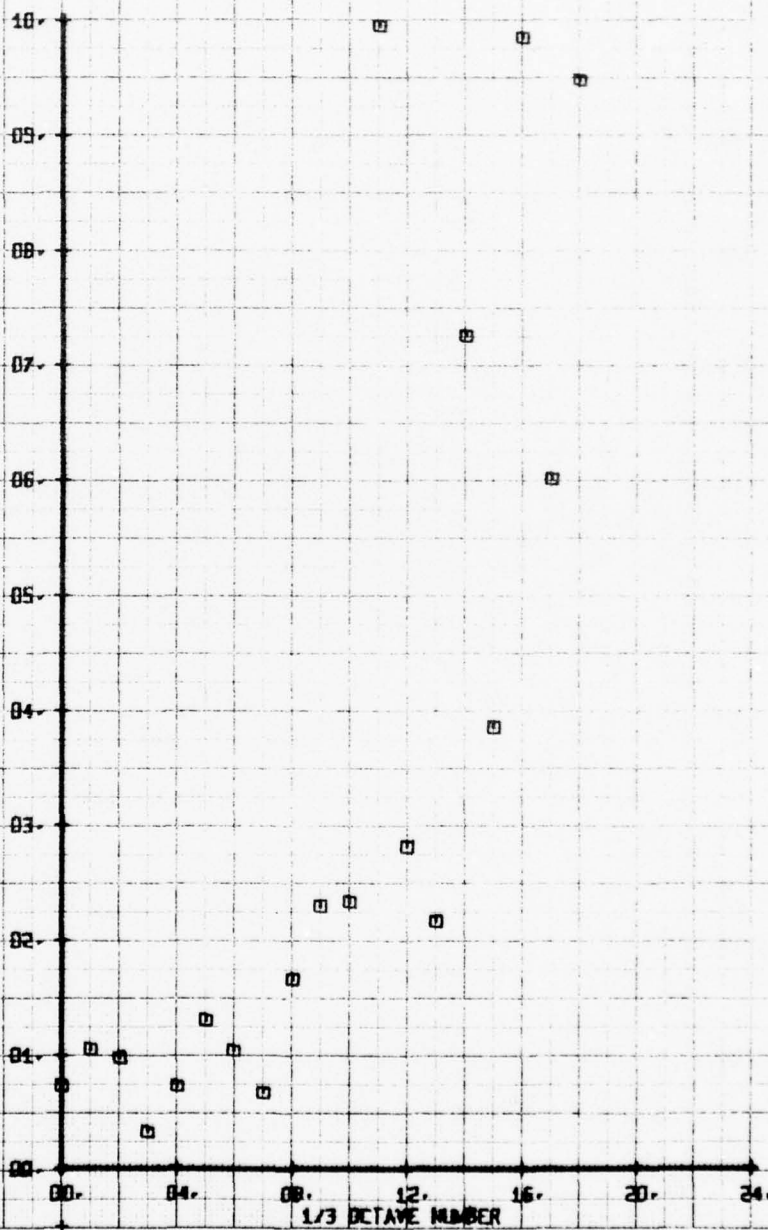
X-Y VELOCITY COMPONENT V-ALPHA FPS



MOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60s2-45N₃(H1-2-1)
 RUN 207 TP 7

LEGEND
 CH. PARAMETER
 66 V-ALPHA

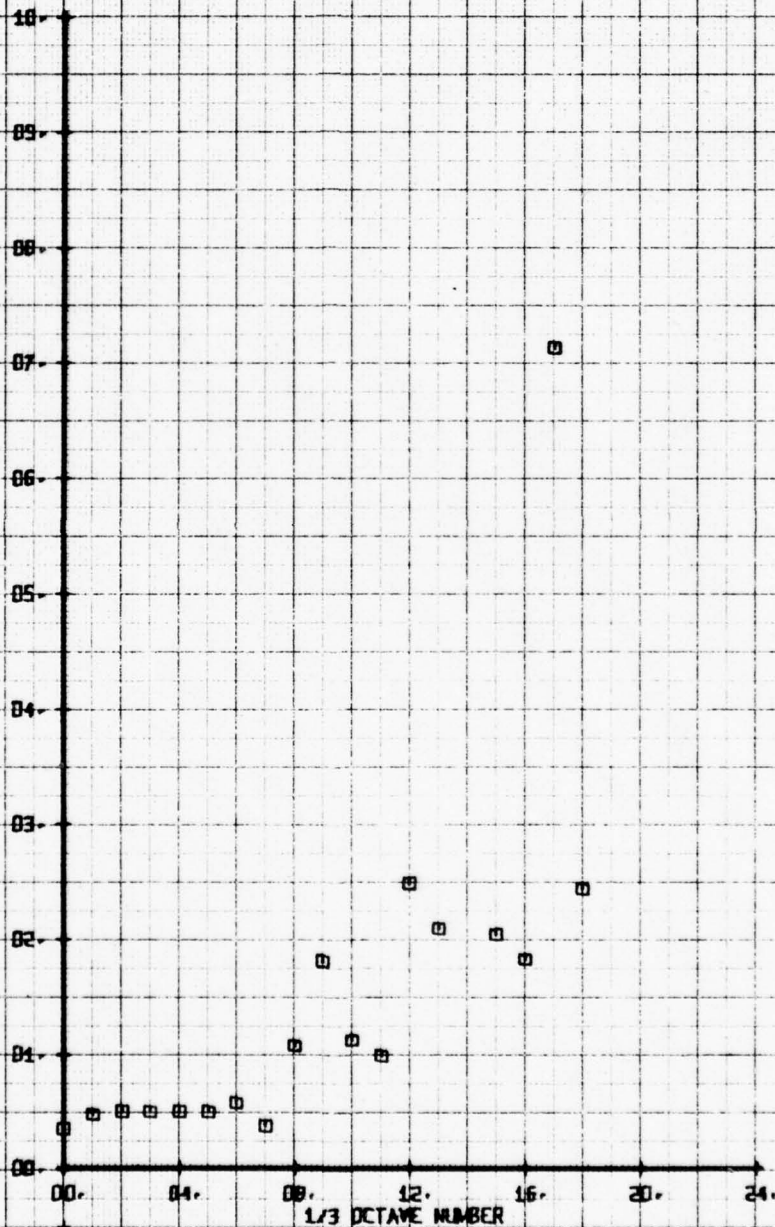
X-Y VELOCITY COMPONENT V-ALPHA RPS

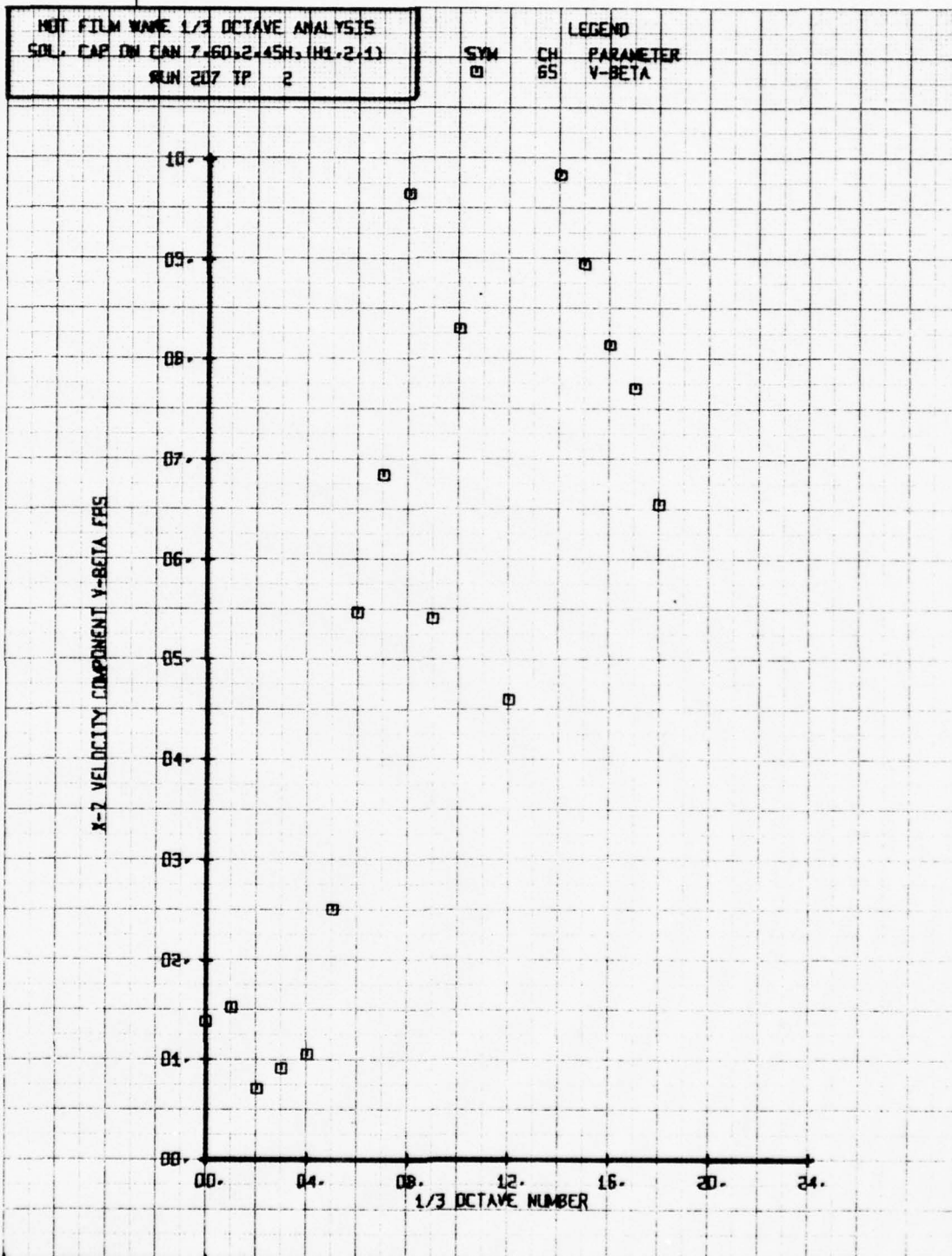


NOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60, 2.45H, (H1, 2, 1)
 RUN 207 TP 2

SYN CH
 0 66
 V-ALPHA

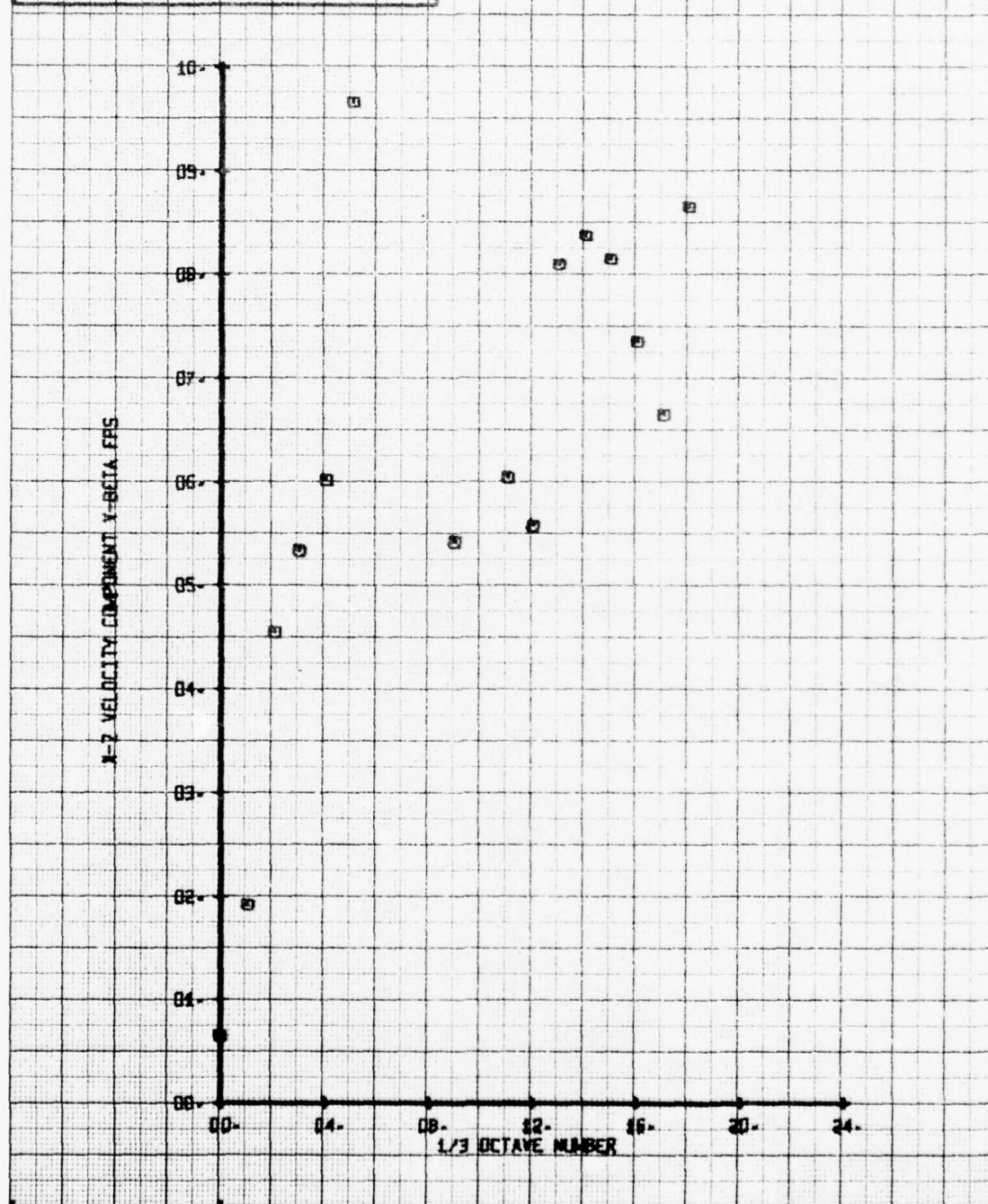
X-Y VELOCITY COMPONENT V-ALPHA FPS





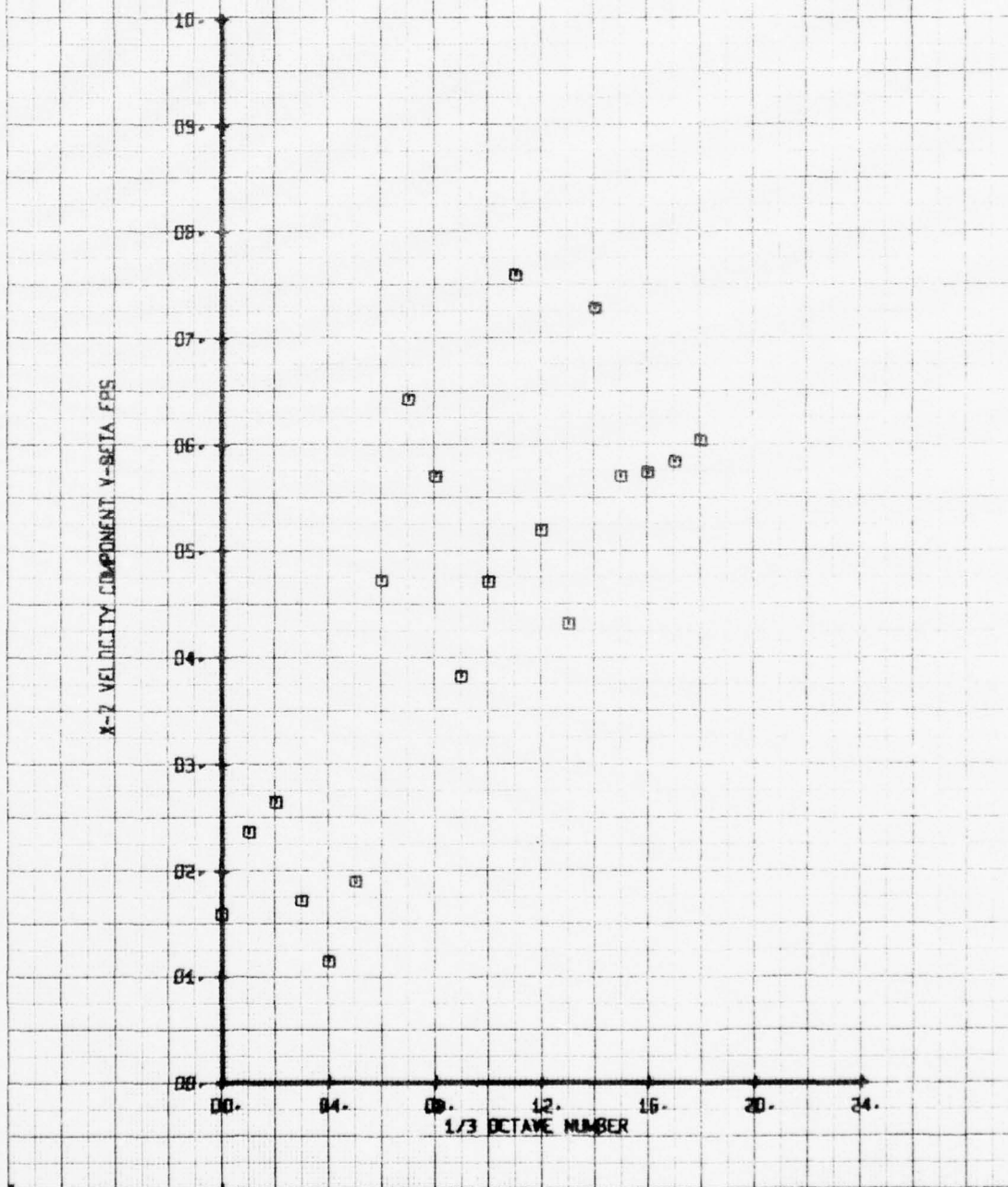
NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7.60, 2.45H, (H1, 2.1)
 RUN 207 TP 3

LEGEND
 CH. PARAMETER
 65 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-6032-45H3 (H1-2-1)
 RUN 207 TP 4

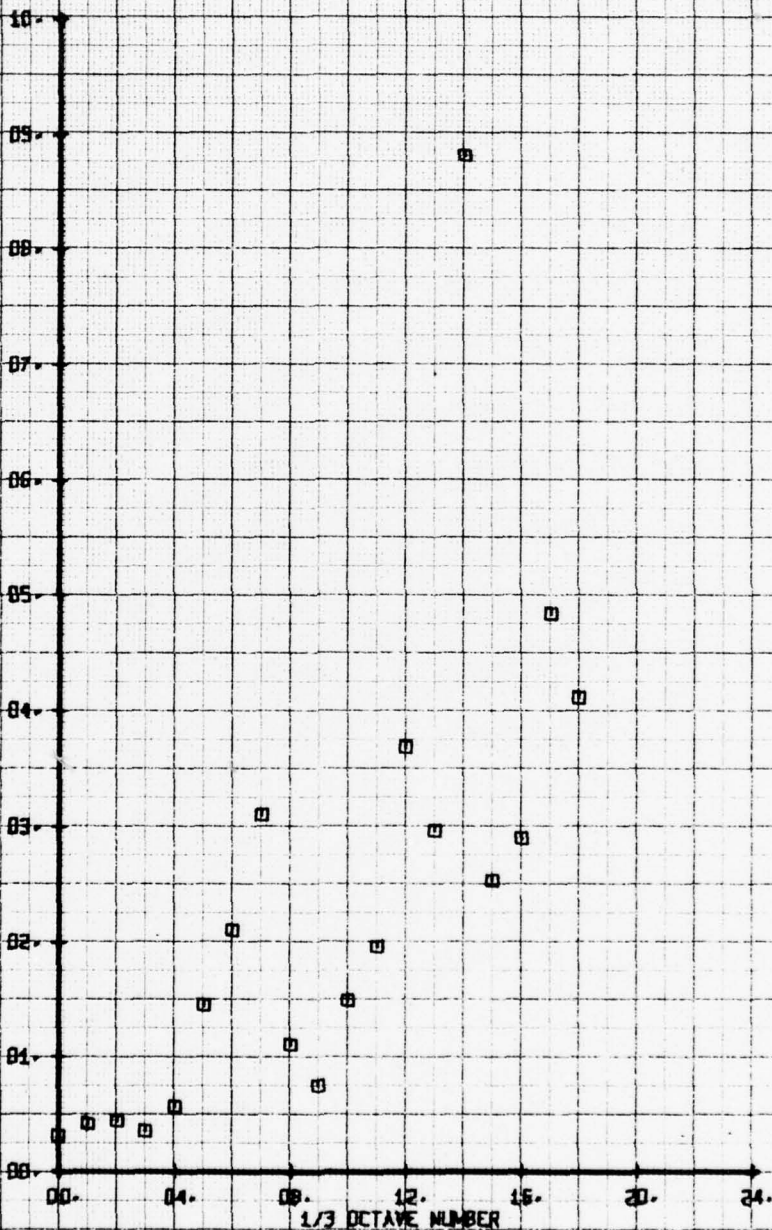
SYM CH PARAMETER
 □ 65 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON FAN 7.60x2.45H₂(H1.2-1)
 RUN 207 TP 5

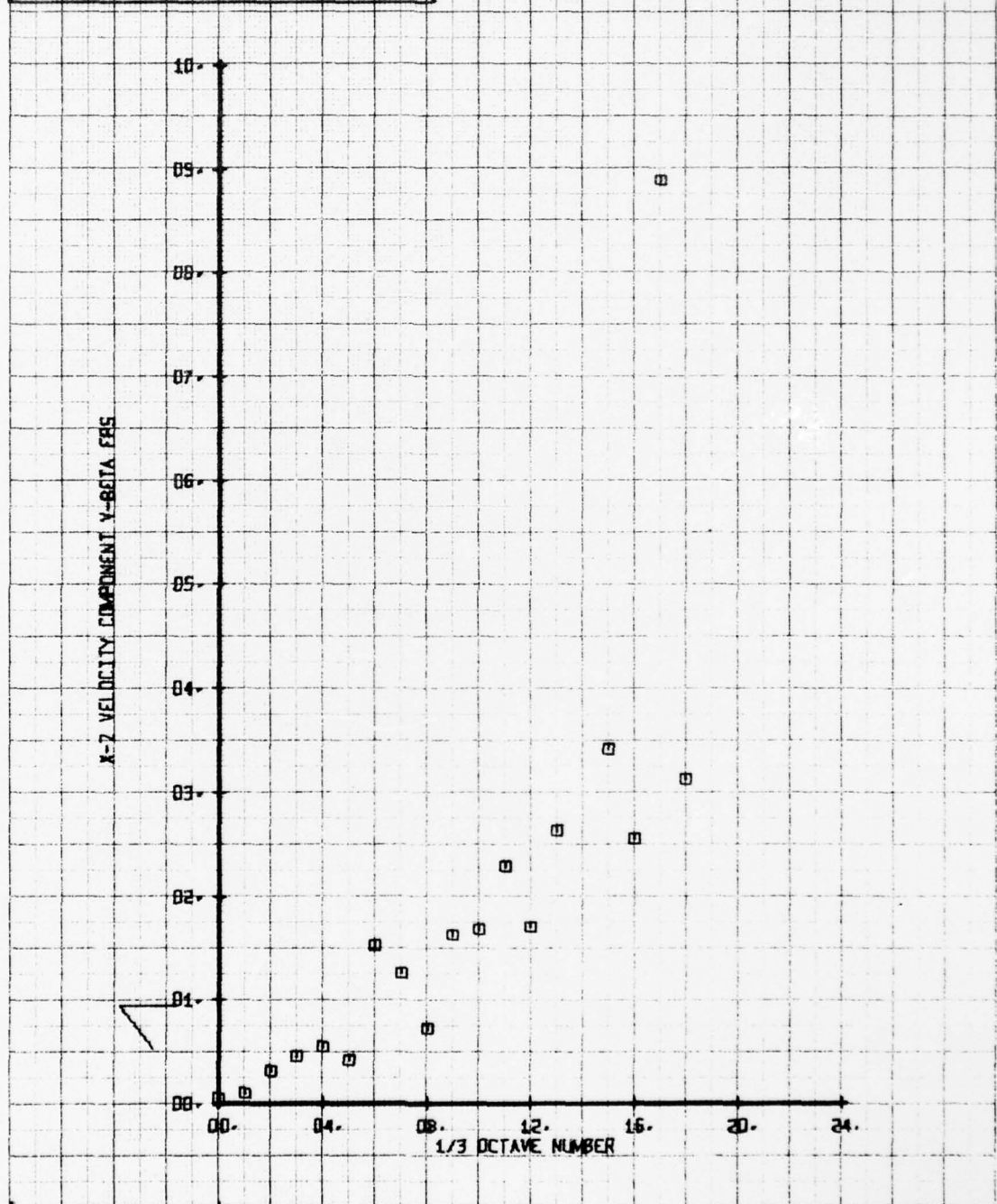
LEGEND	
SYM	CH
□	65
	PARAMETER
	V-BETA

X-7 VELOCITY COMPONENT V-BETA FPS



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-2, 45H, 1H1, 2, 11
 RUN 207 TP 6

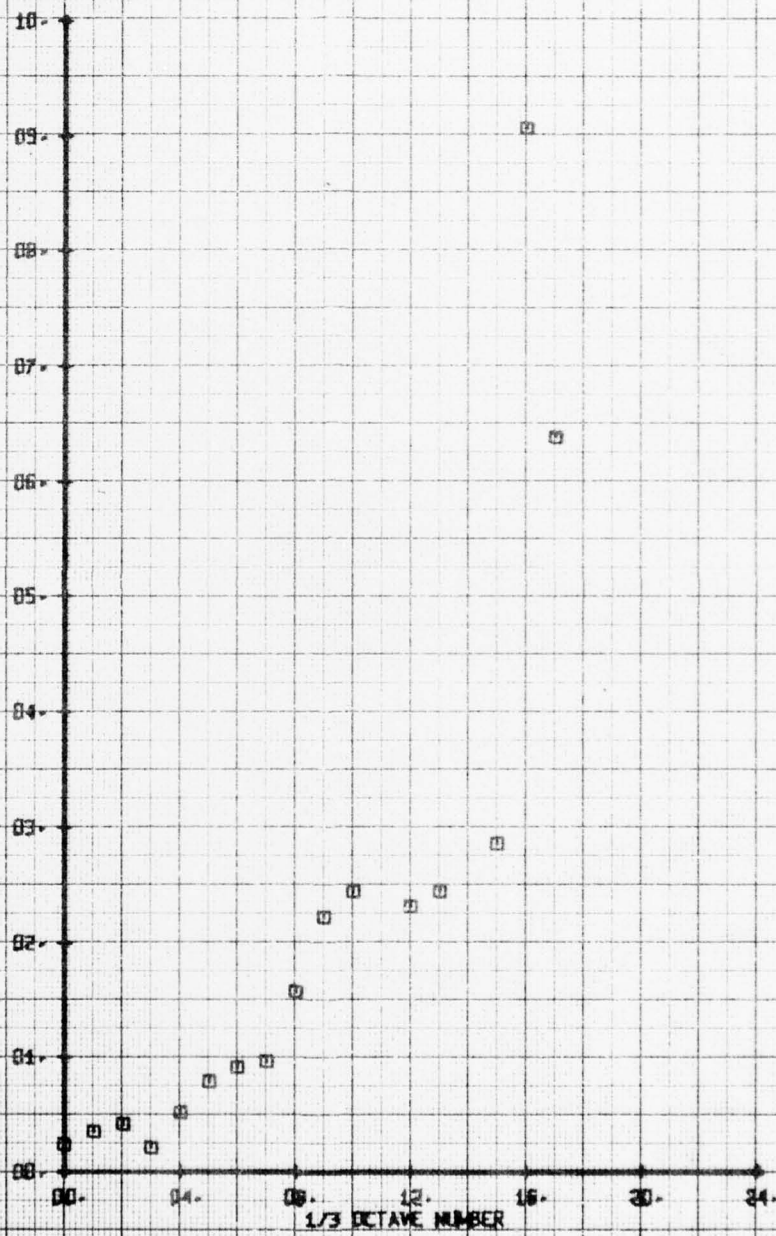
SYM CH
 0 65
 LEGEND
 PARAMETER
 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-60-245H (H1,2,4)
 RUN 207 TP 7

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

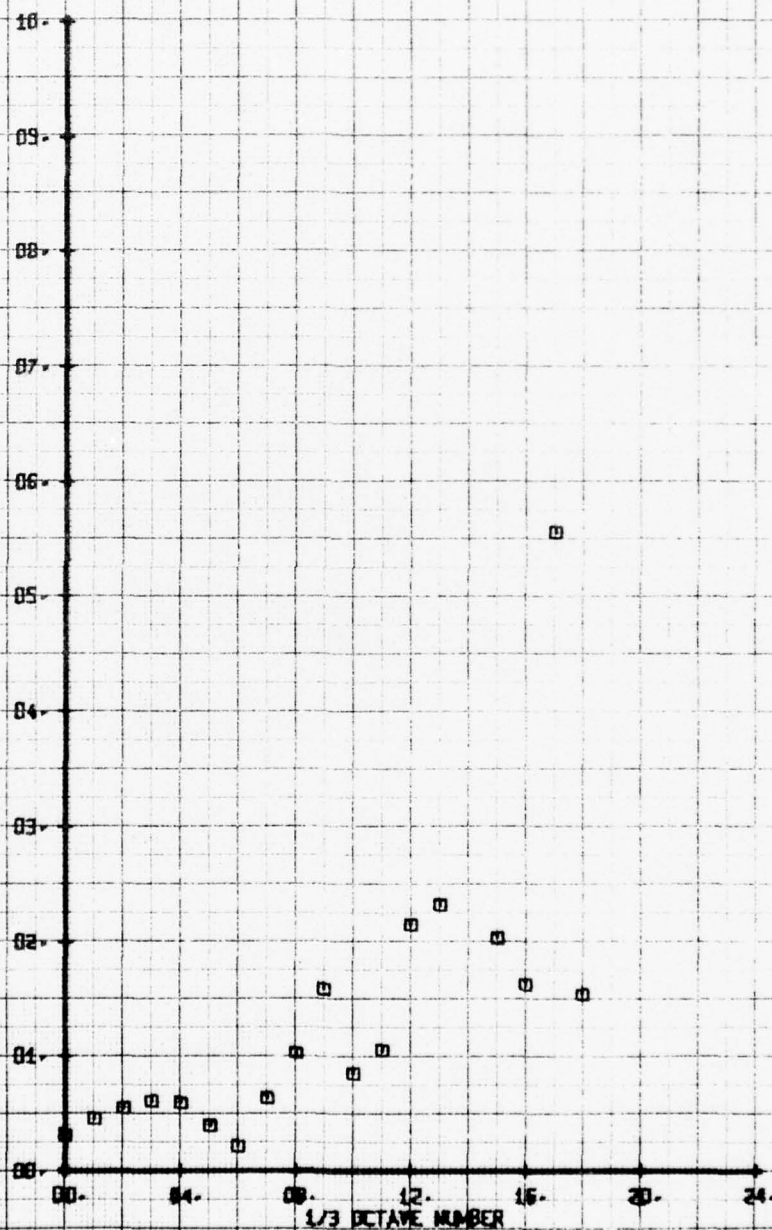
X-2 VELOCITY COMPONENT V-BETA FFS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP ON CAN 7-6032-45H (H1-2-4)
 RUN 207 TP B

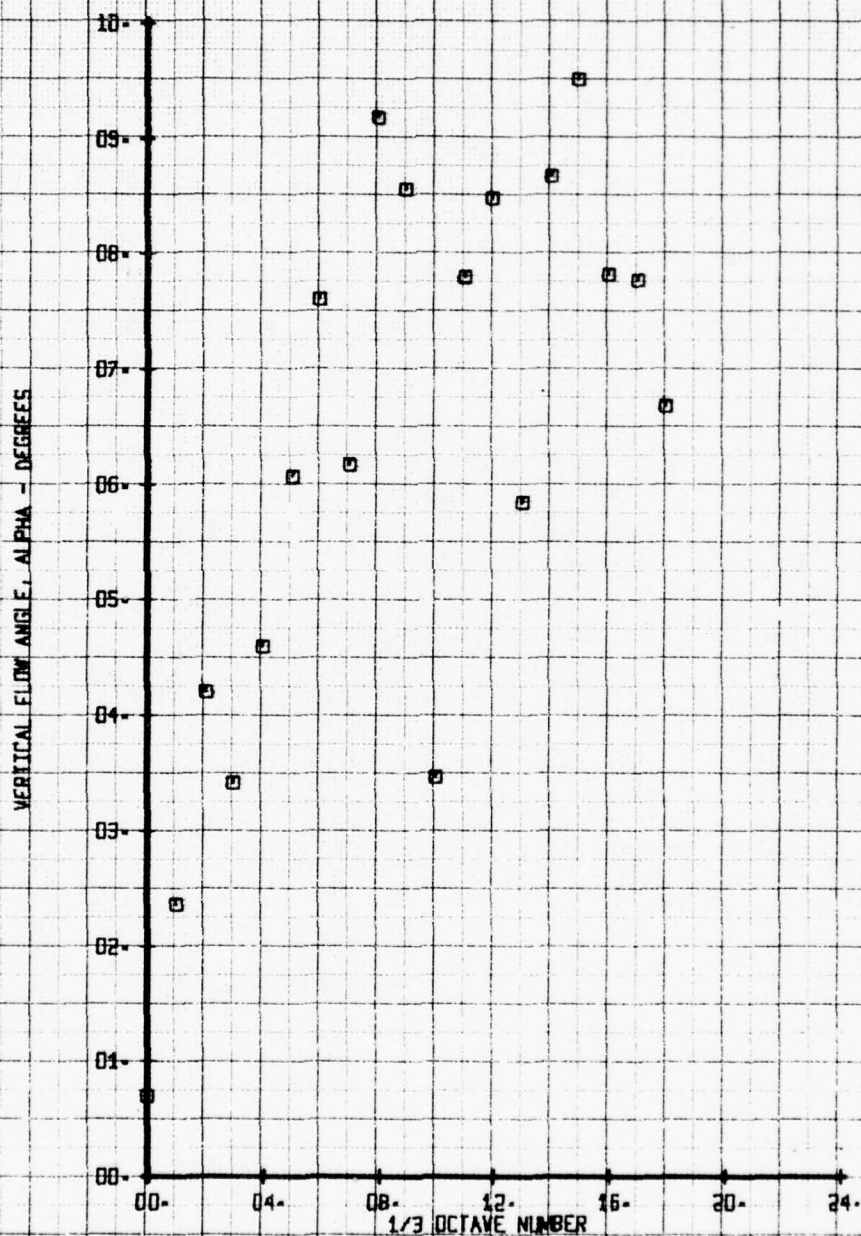
LEGEND
 CH 65
 PARAMETER
 V-BETA

X-Z VELOCITY COMPONENT V-BETA FHS



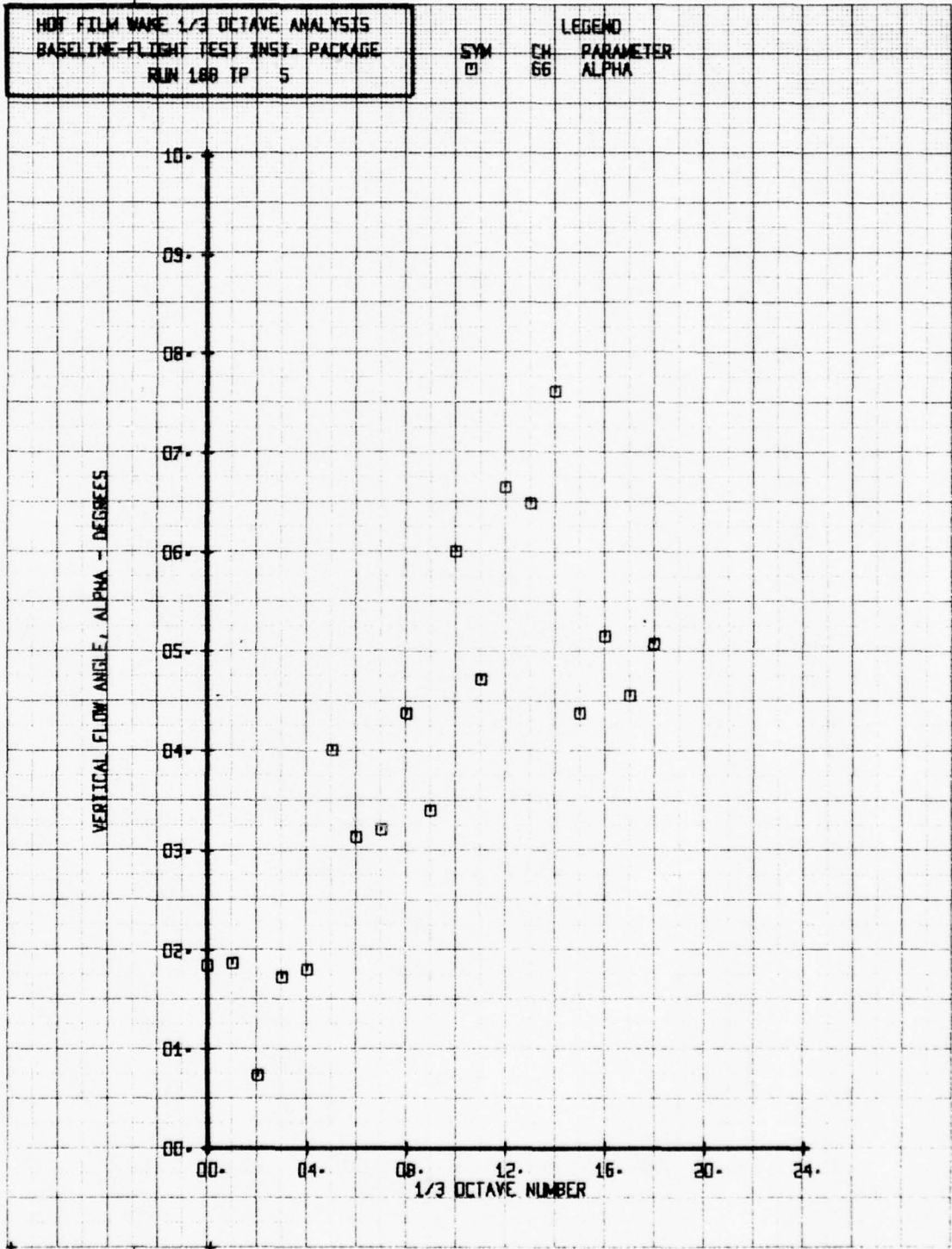
HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 4

SYN CH
 0 66
 LEGEND
 PARAMETER
 ALPHA



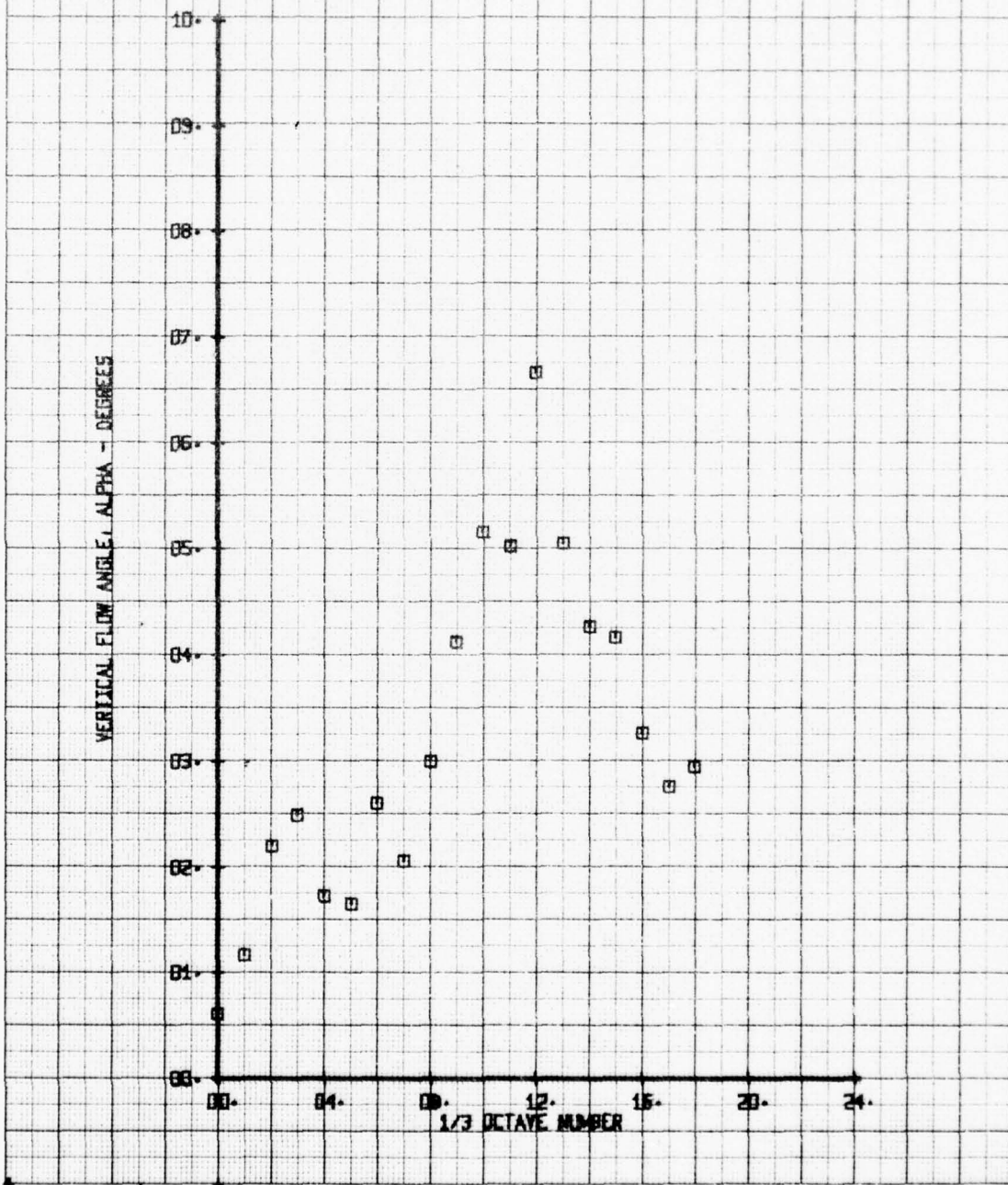
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 5

SYM CH PARAMETER
 □ 66 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 100 TP 6

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA



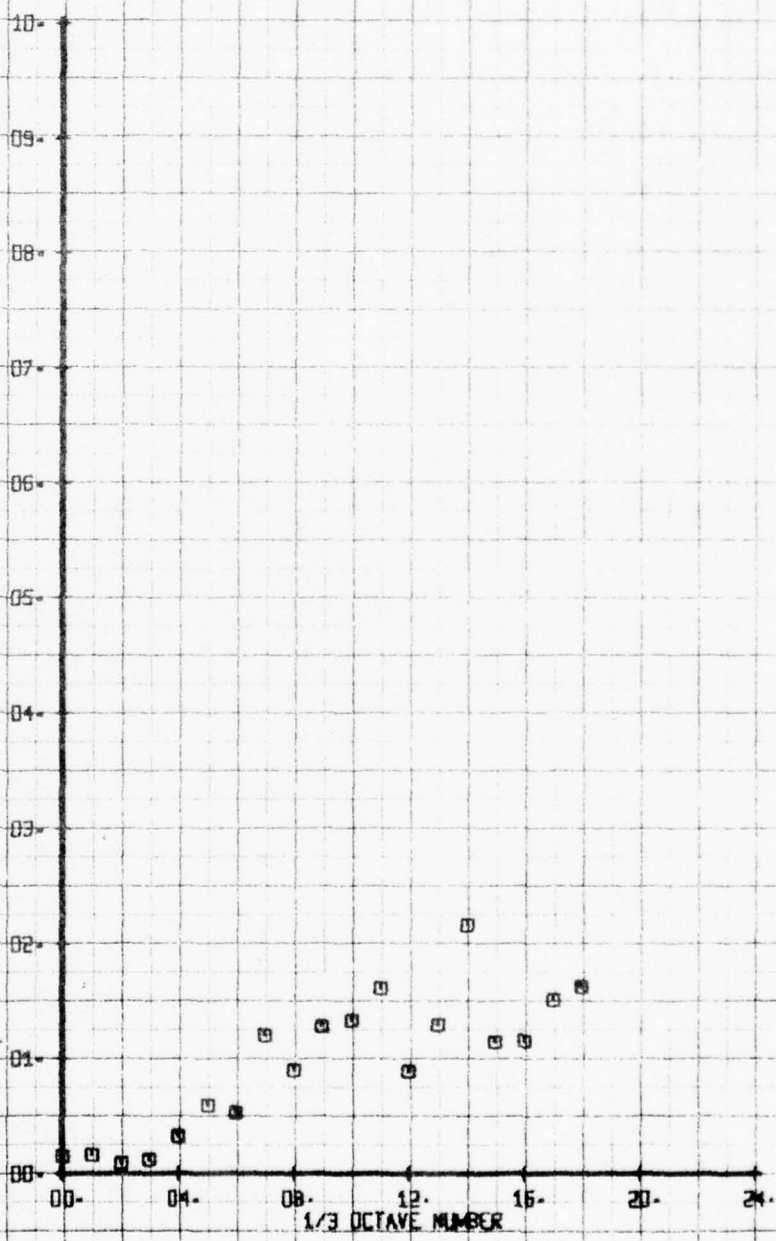
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 7

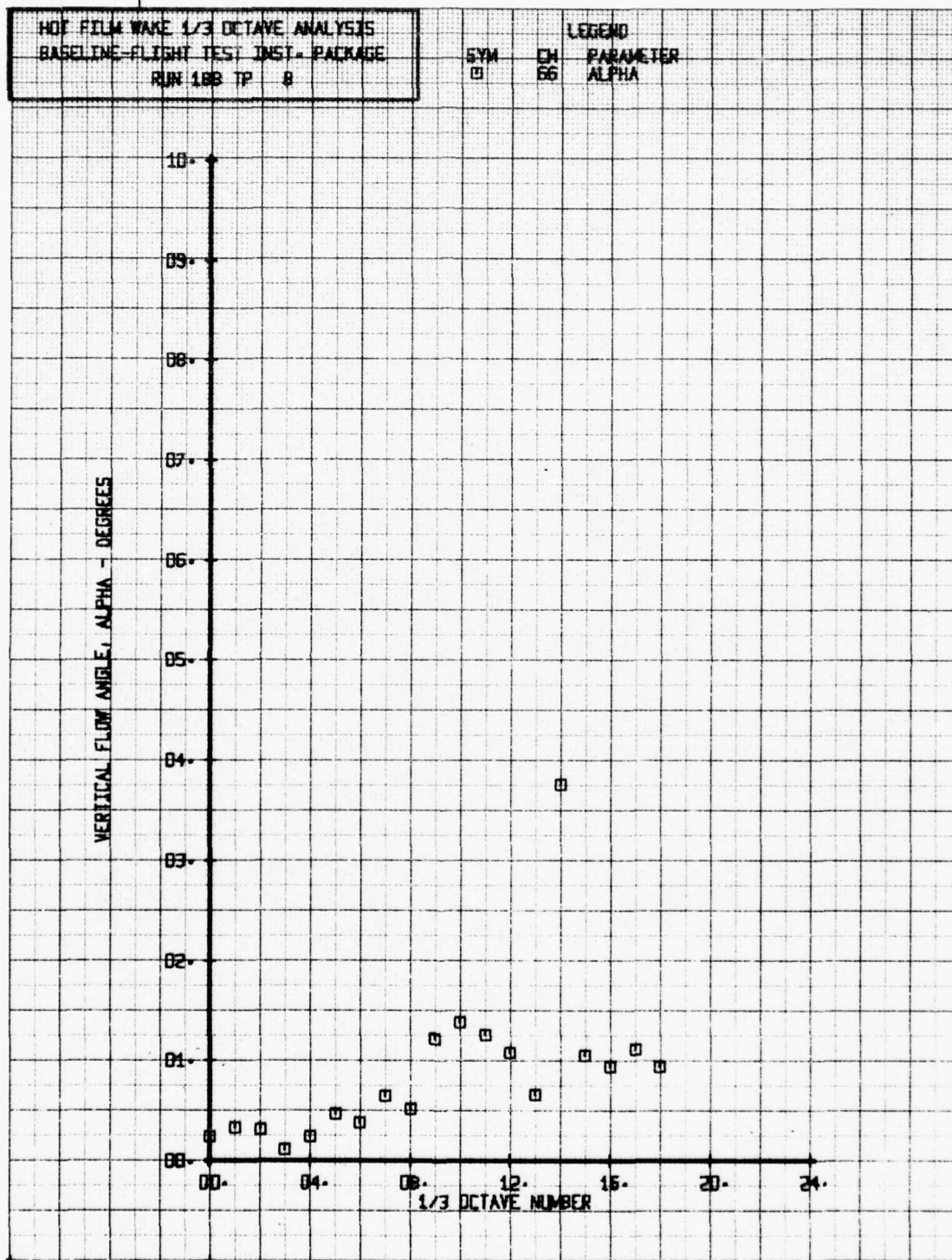
SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

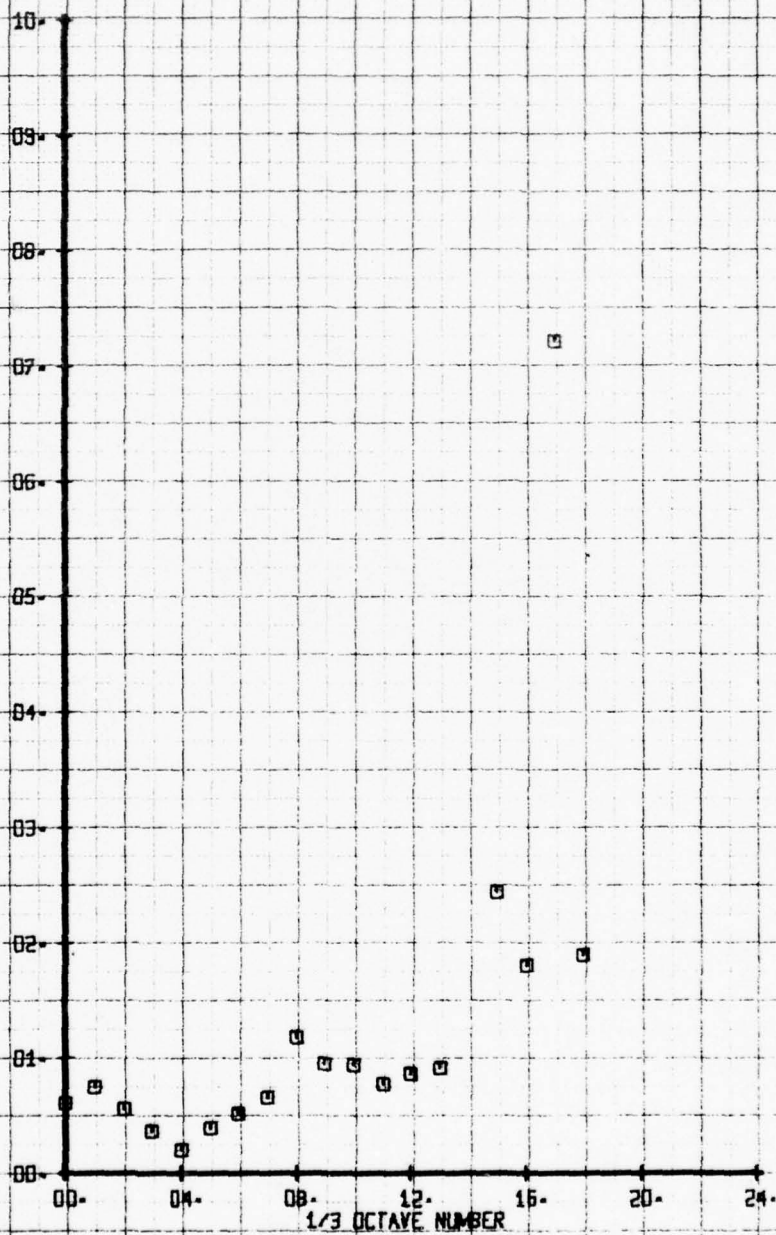




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 9

LEGEND
SYM CH PARAMETER
□ 66 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

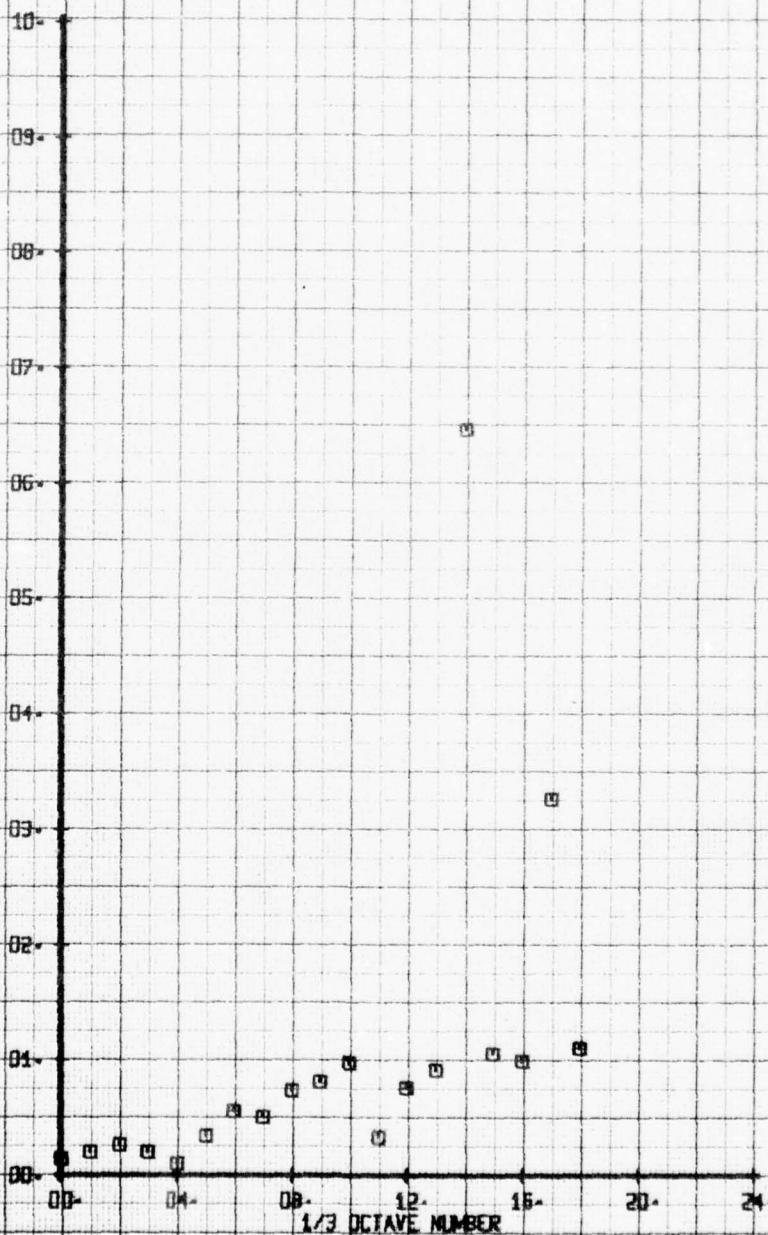


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 10

SYM
 0

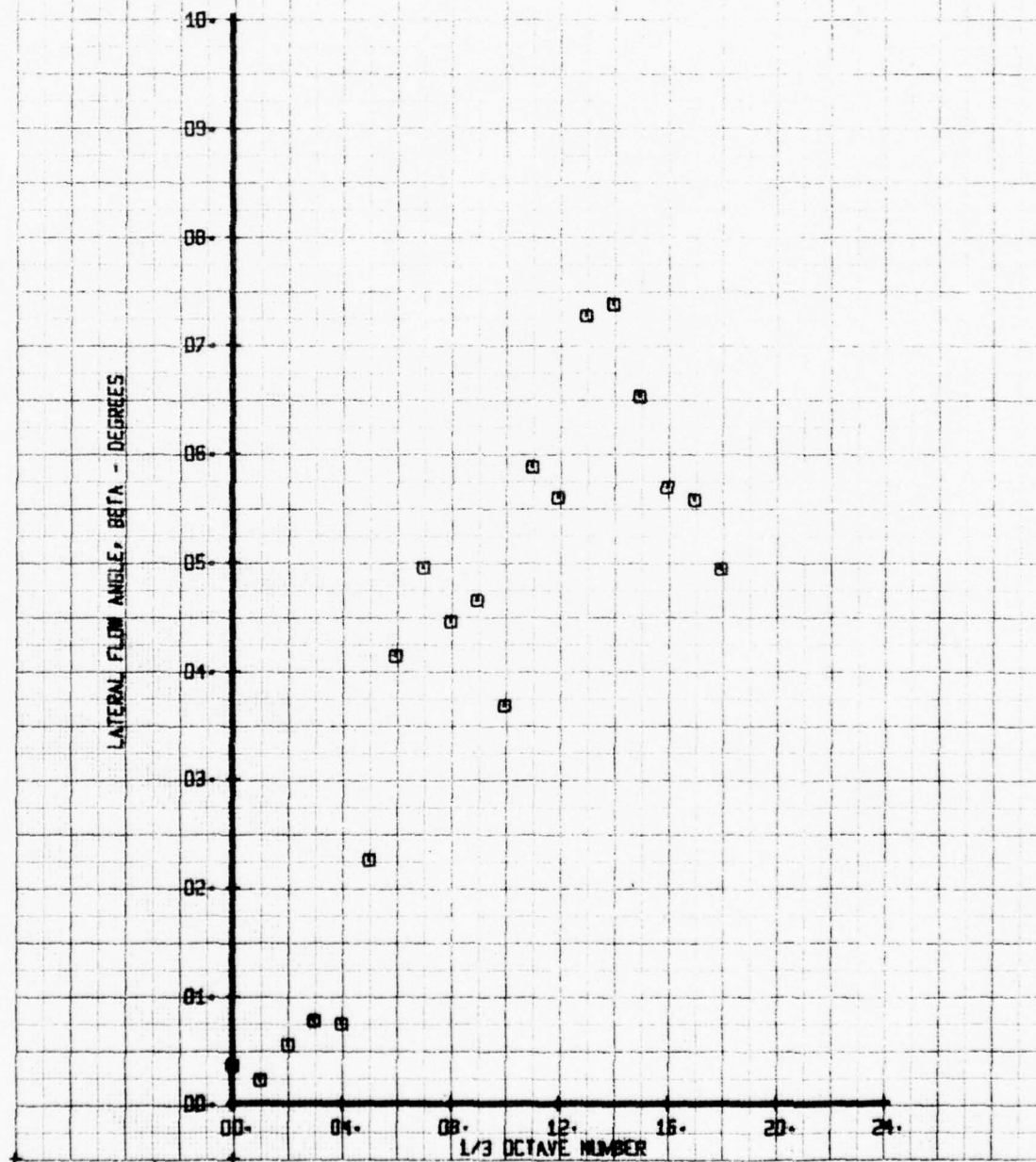
LEGEND
 CH. 56
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



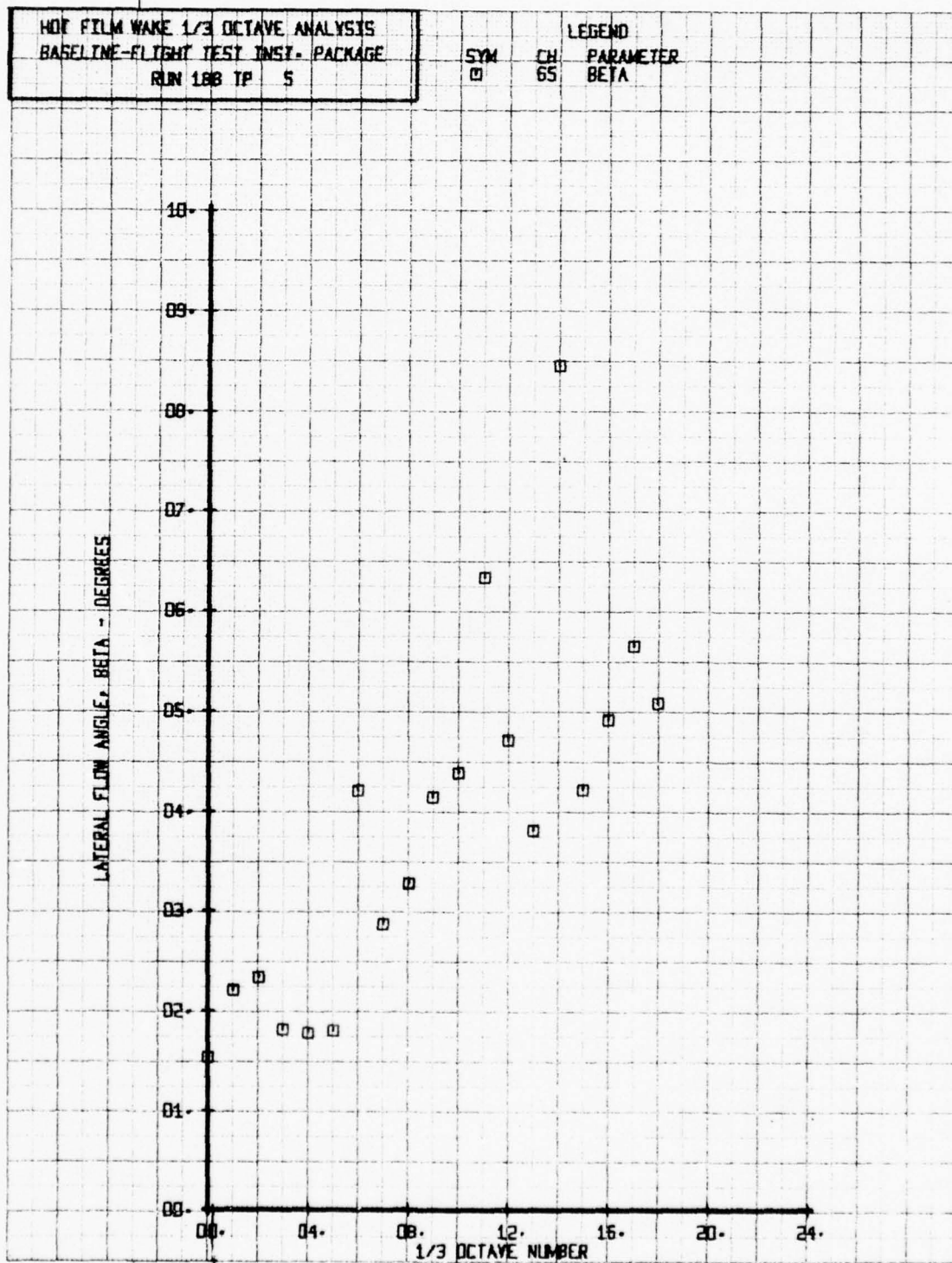
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 18B TP 4

LEGEND
 SYM CH PARAMETER
 □ 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 5

SYM CH PARAMETER
 □ 65 BETA



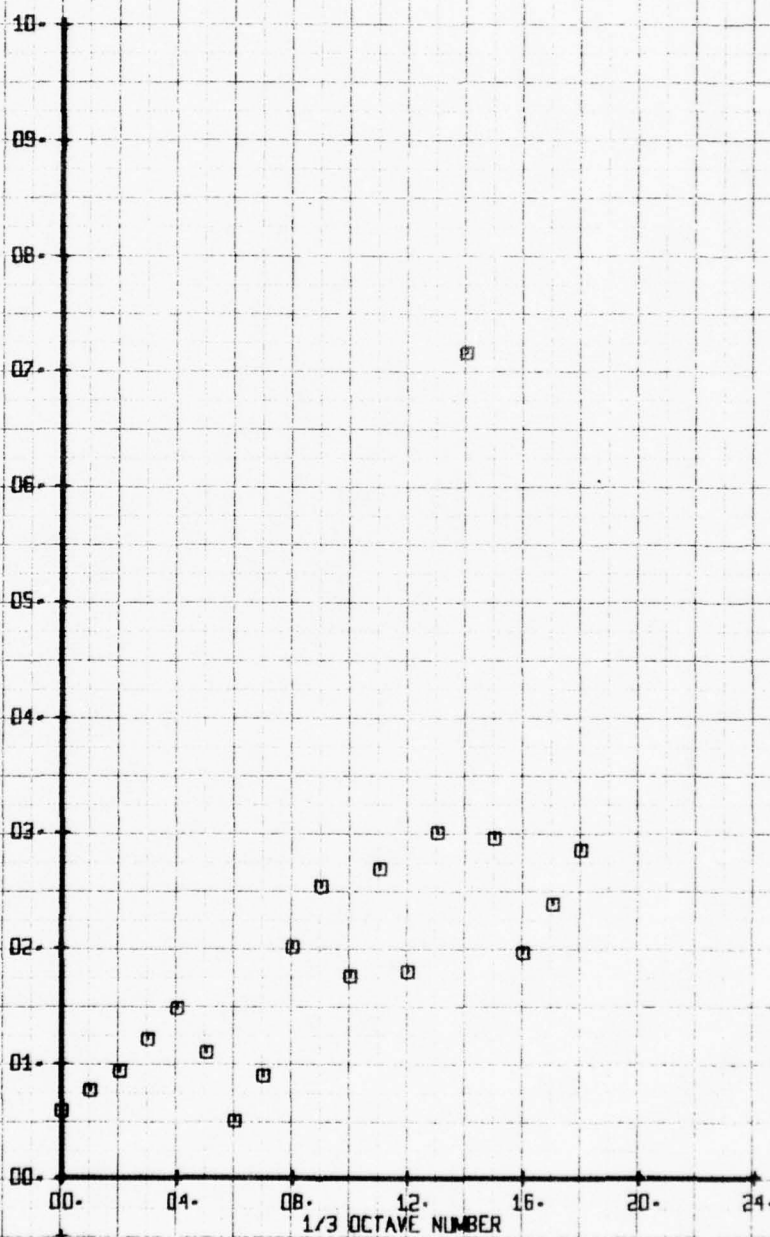
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 6

SYM
 □

CH
 65

LEGEND
 PARAMETER
 BETA

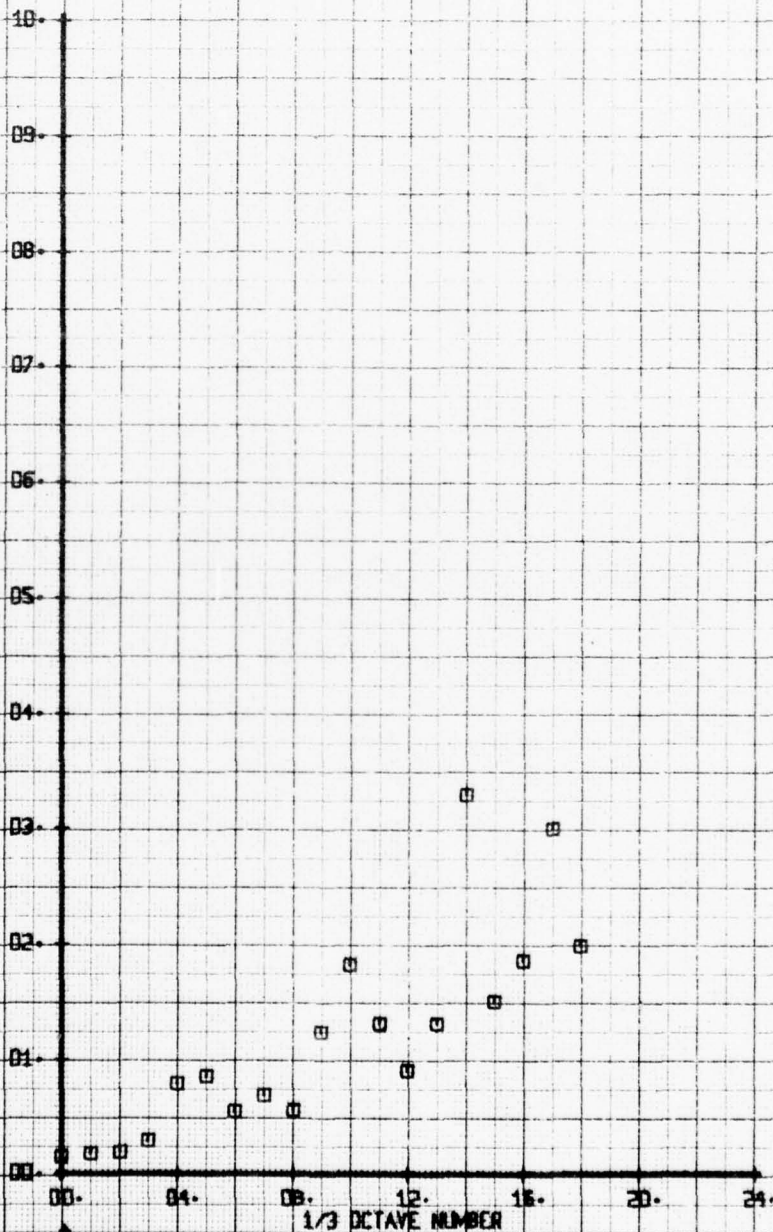
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 7

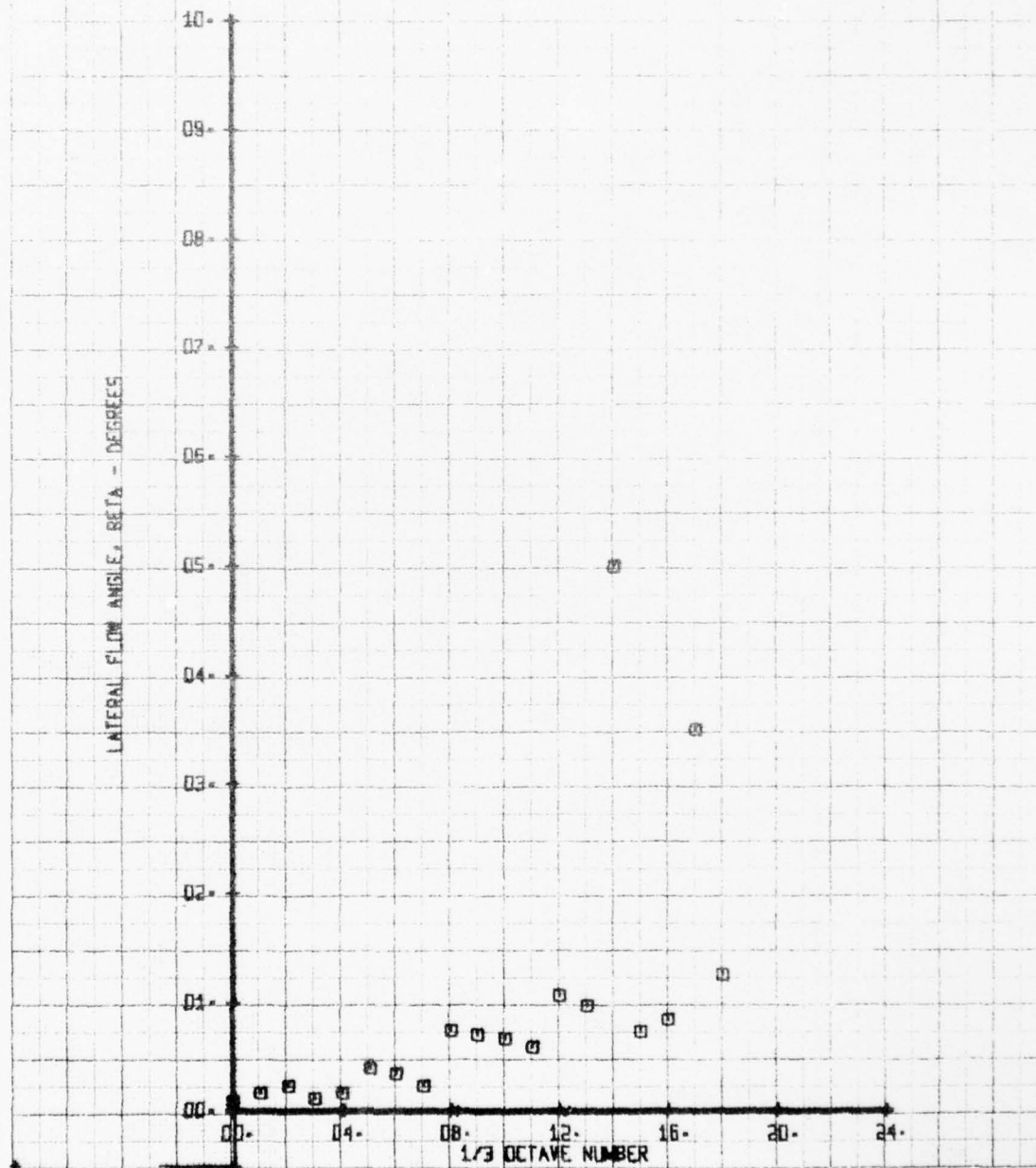
LEGEND		
SYM	CH	PARAMETER
□	65	BETA

LATERAL FLOW ANGLE, BETA - DEGREES



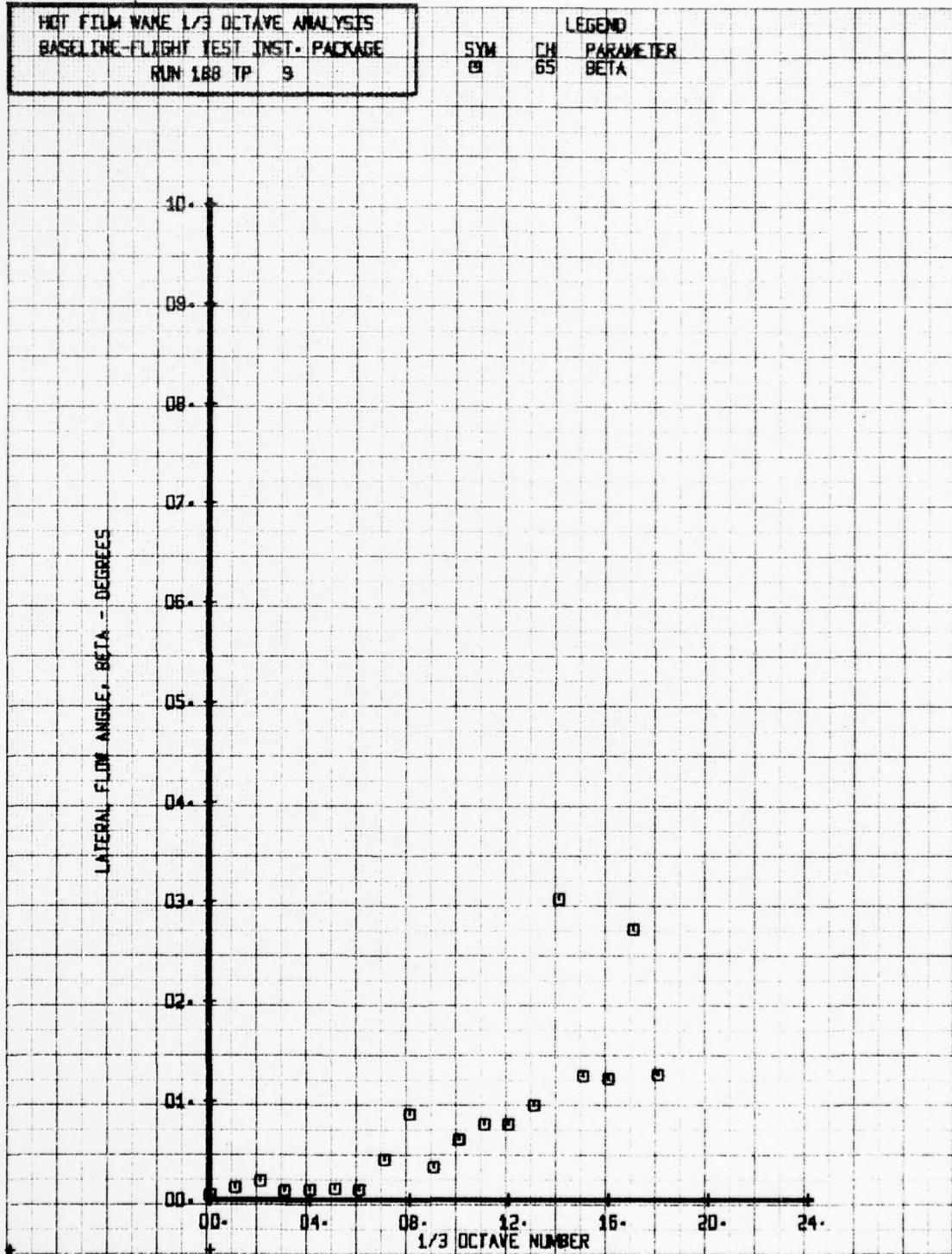
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 8

LEGEND
SYM CH PARAMETER
□ 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 9

SYM	CH	PARAMETER
□	65	BETA



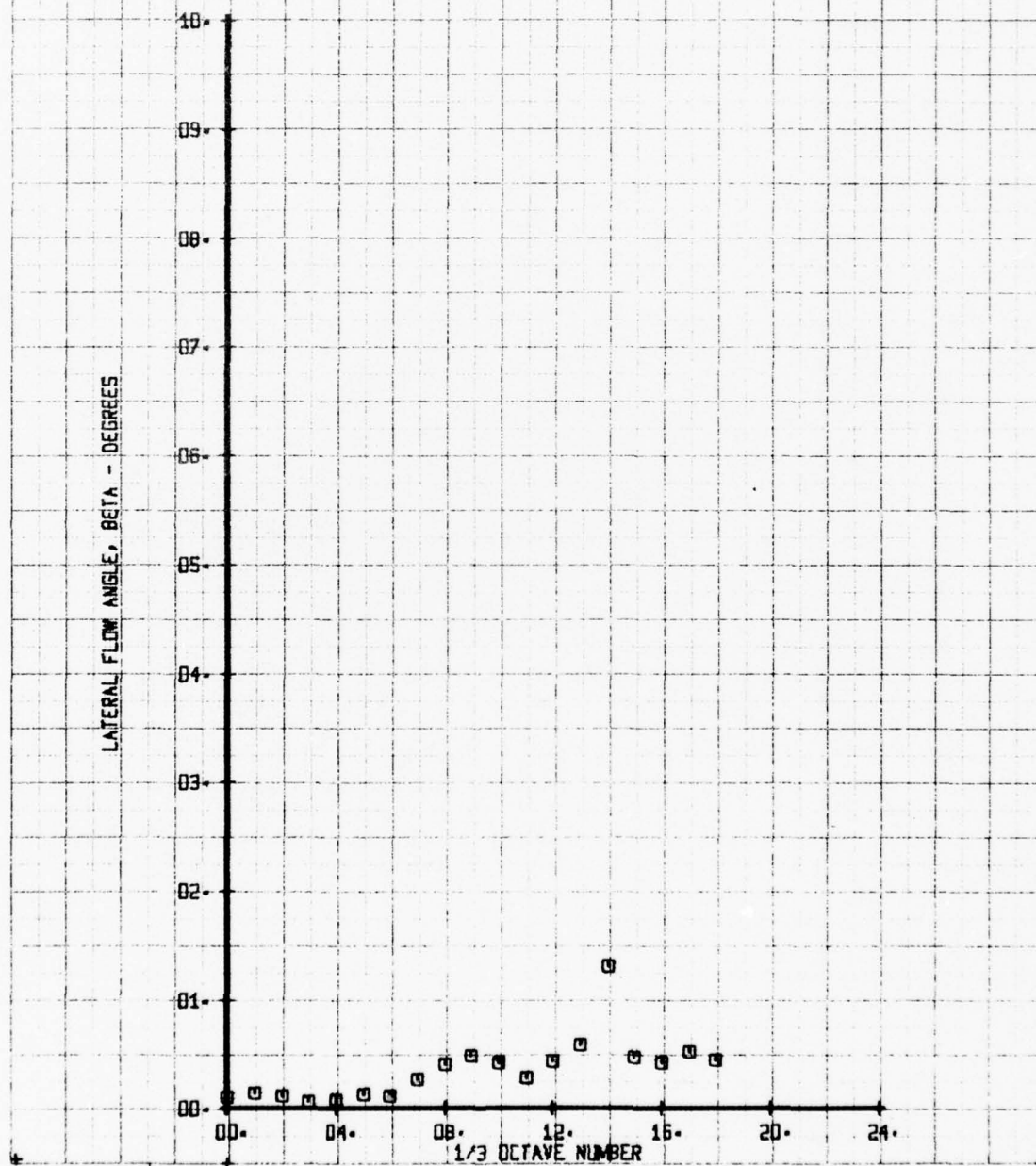
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 10

SYM
□

CH
65

LEGEND
PARAMETER
BETA

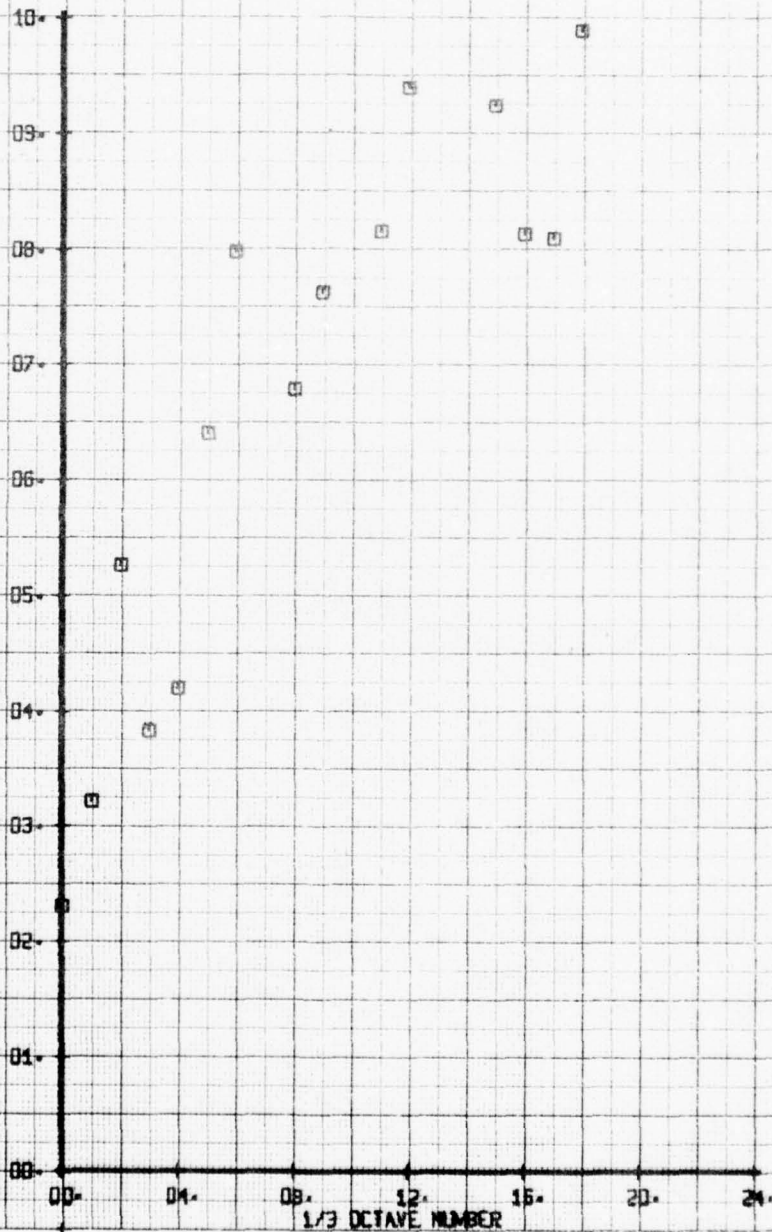
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 4

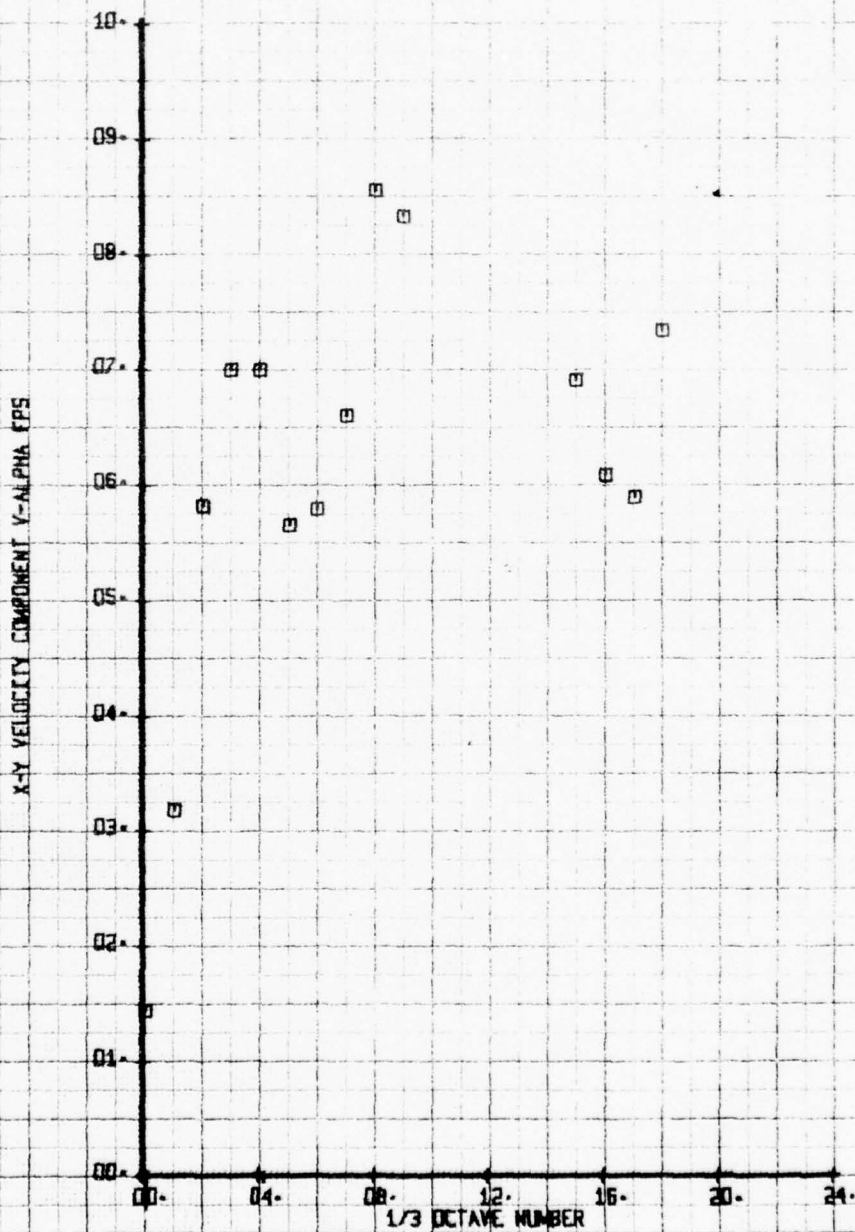
SYN CH PARAMETER
 □ 66 V-ALPHA

K-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 5

LEGEND
SYM CH PARAMETER
□ 66 V-ALPHA



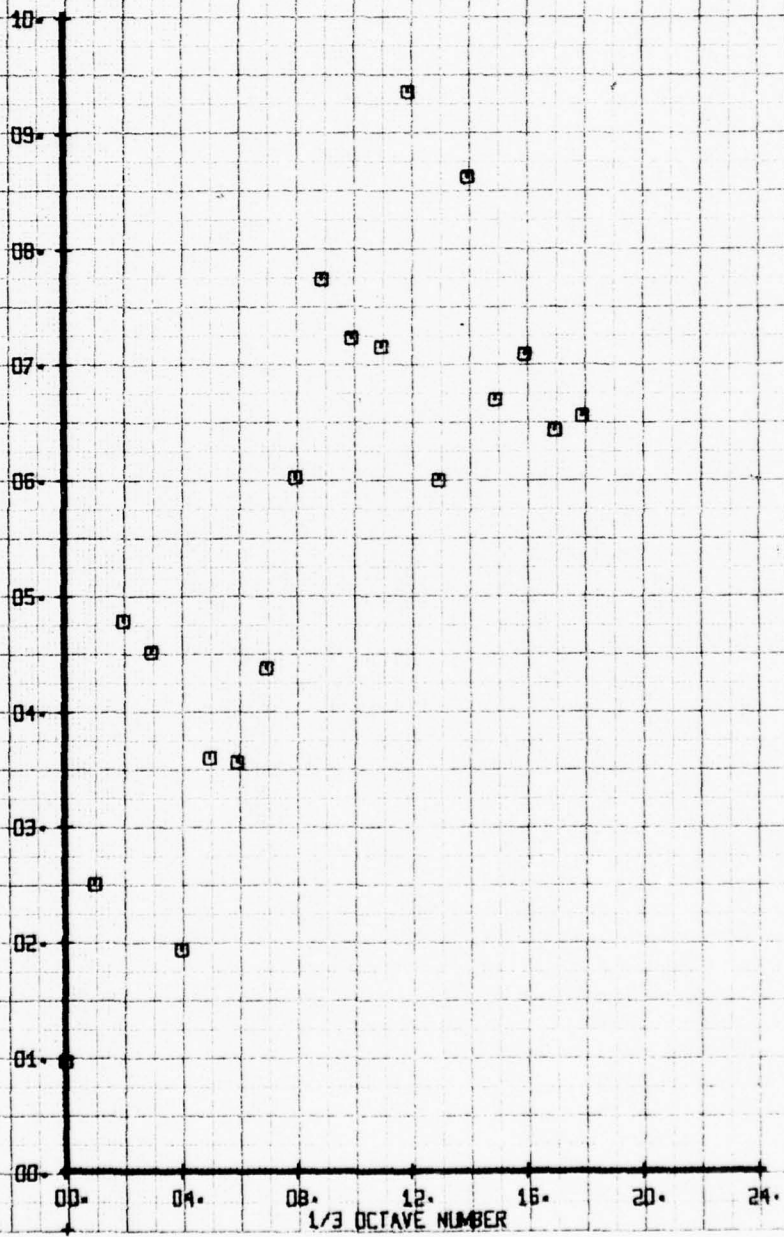
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 6

SYM
 □

CH
 66

LEGEND
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



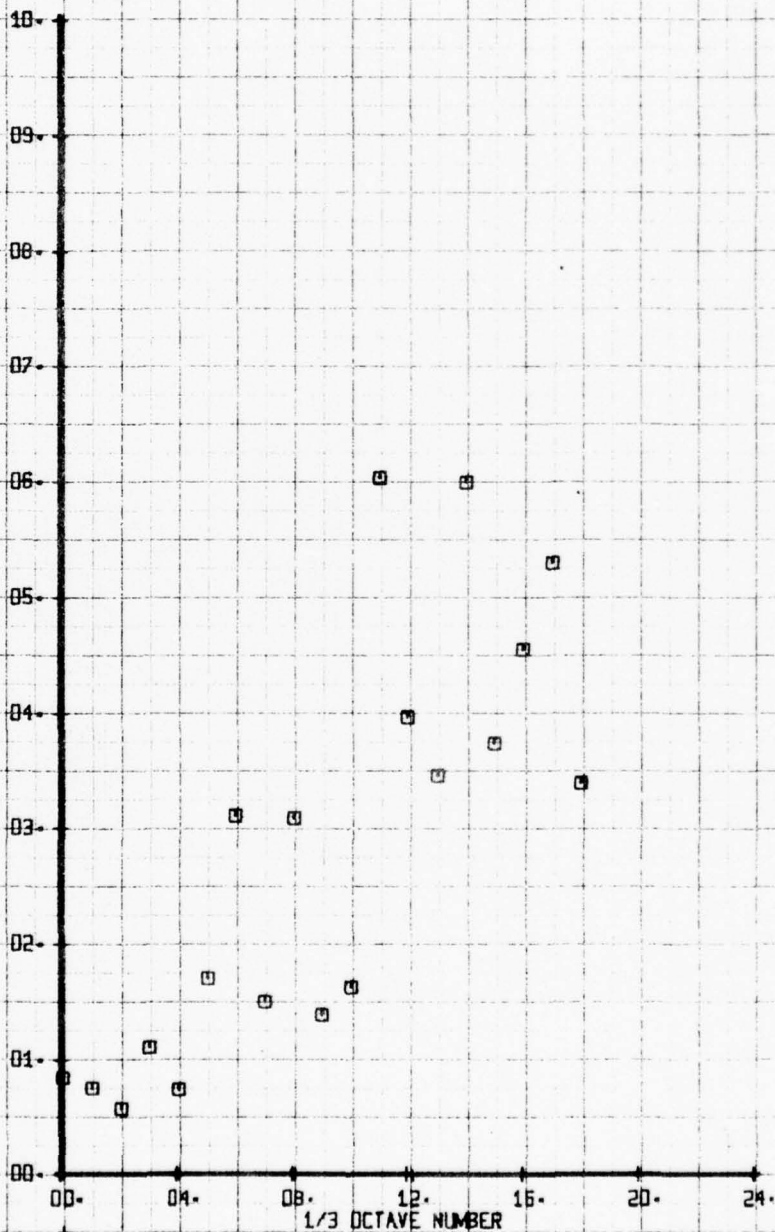
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE FLIGHT TEST INST. PACKAGE
RUN 188 TP 7

SYM
□

CH
66

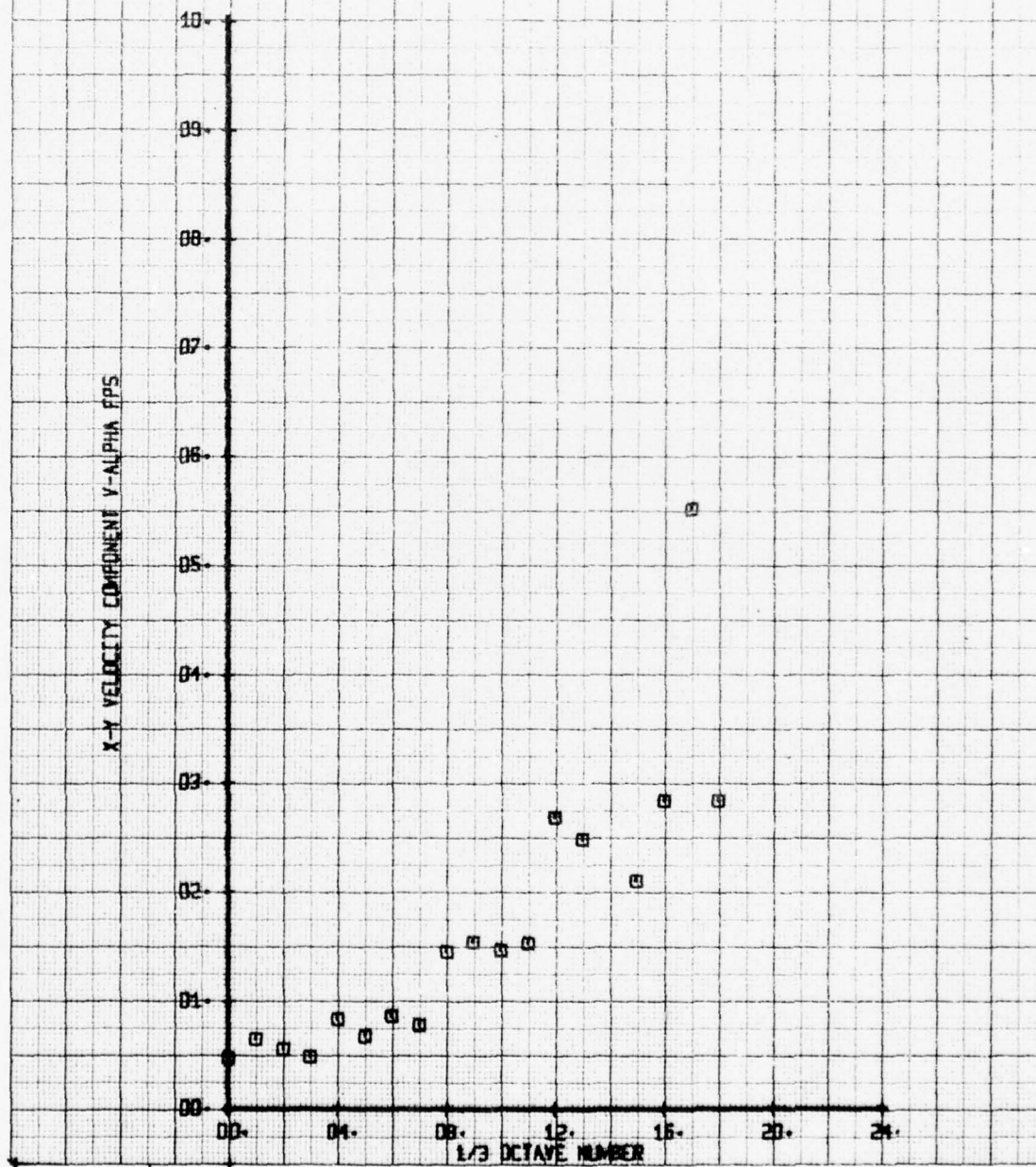
LEGEND
PARAMETER
V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA RPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 128 TP 8

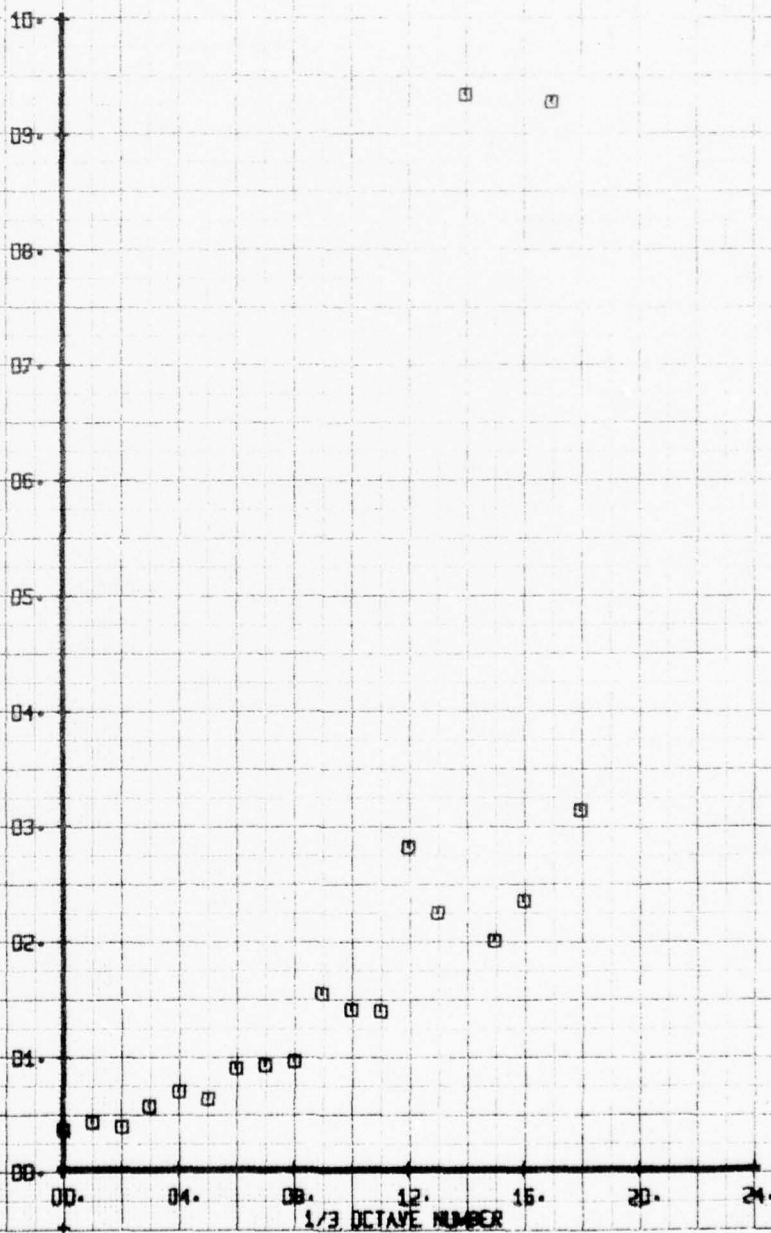
SYM CH PARAMETER
 □ 66 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 9

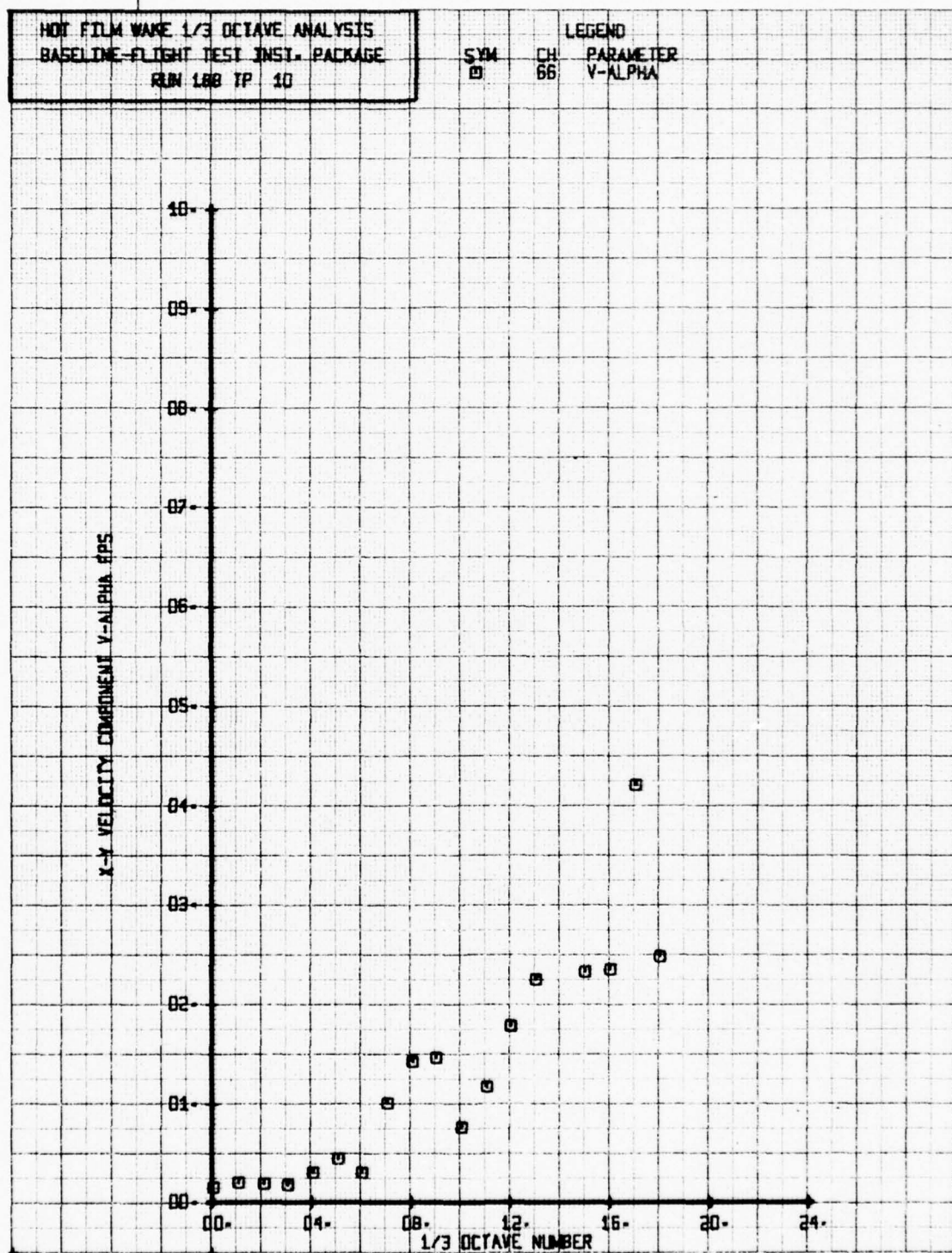
LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

X-V VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
BASELINE-FLIGHT TEST INST. PACKAGE
RUN 188 TP 10

SYM CH PARAMETER
□ 66 V-ALPHA



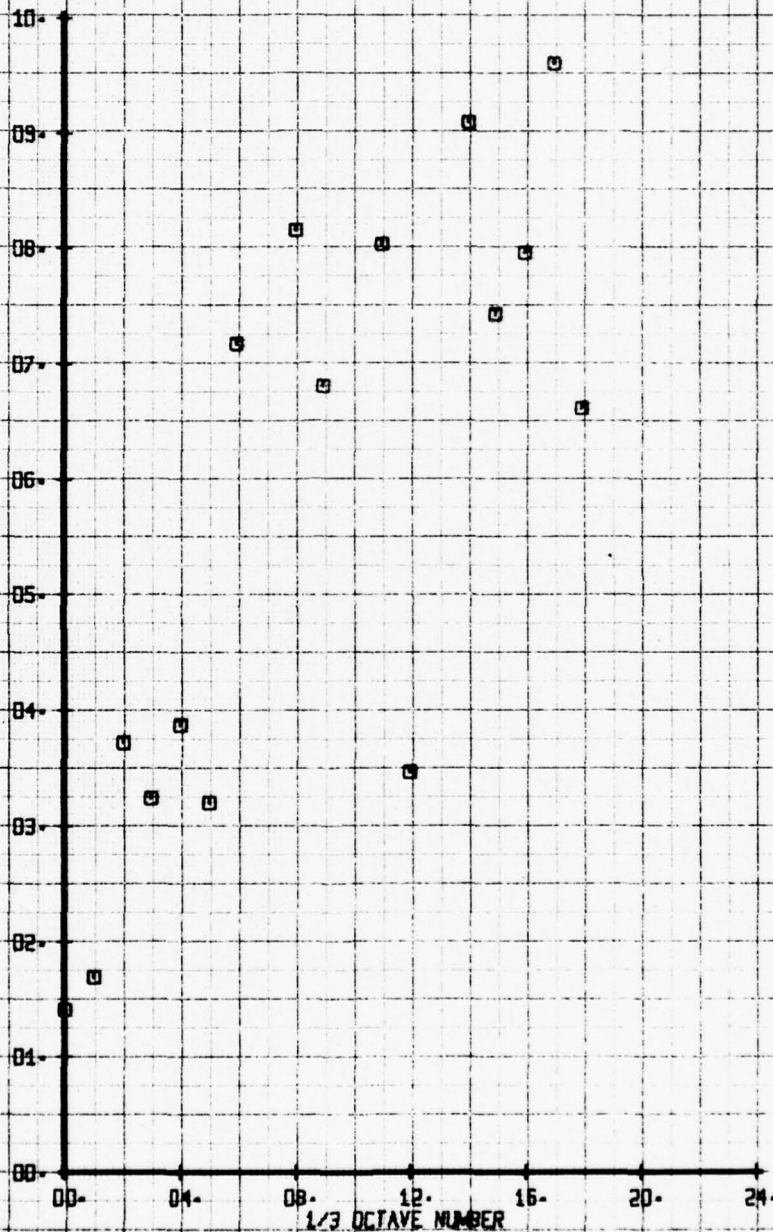
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 4

SYM
 □

CH
 65

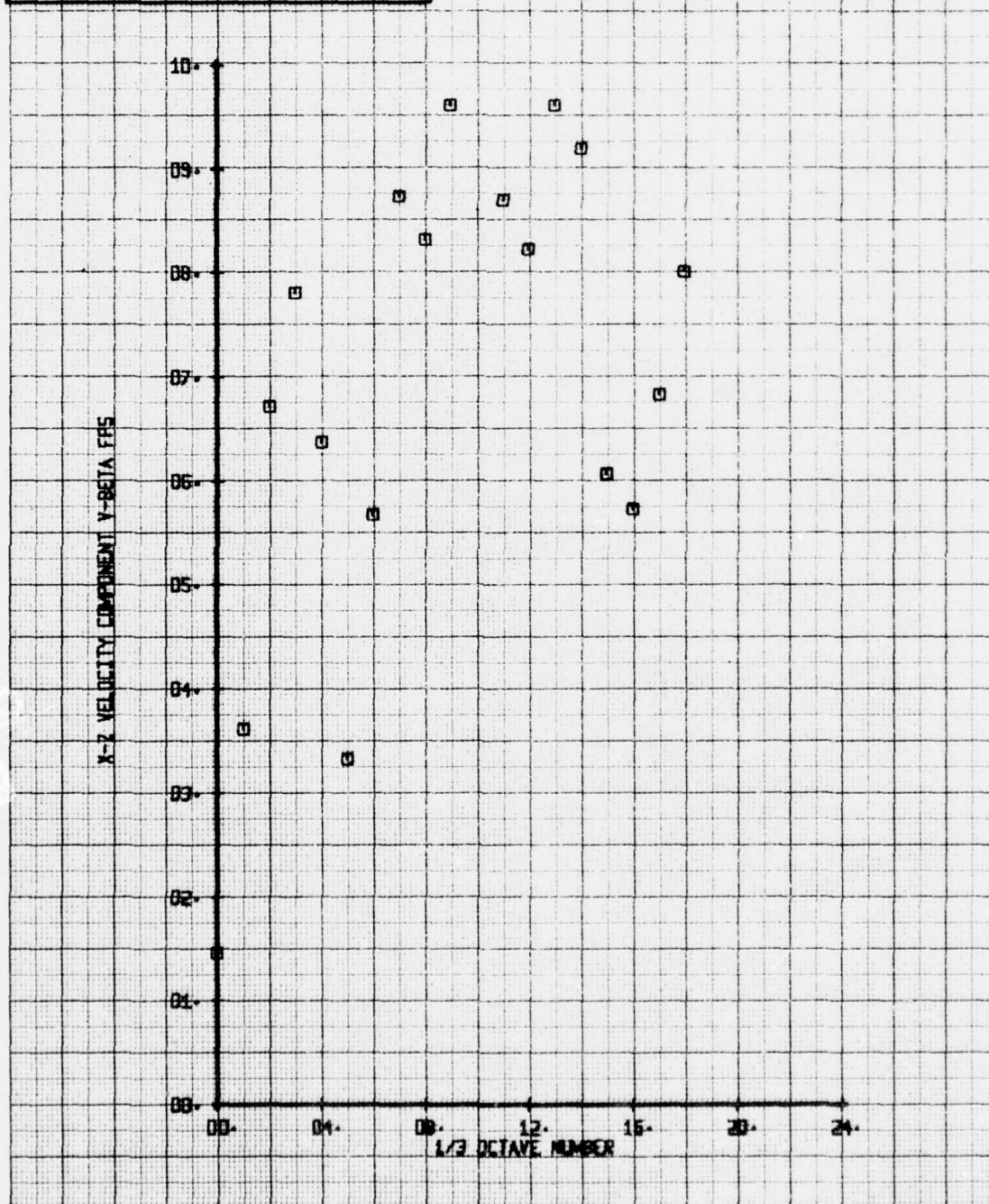
LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 5

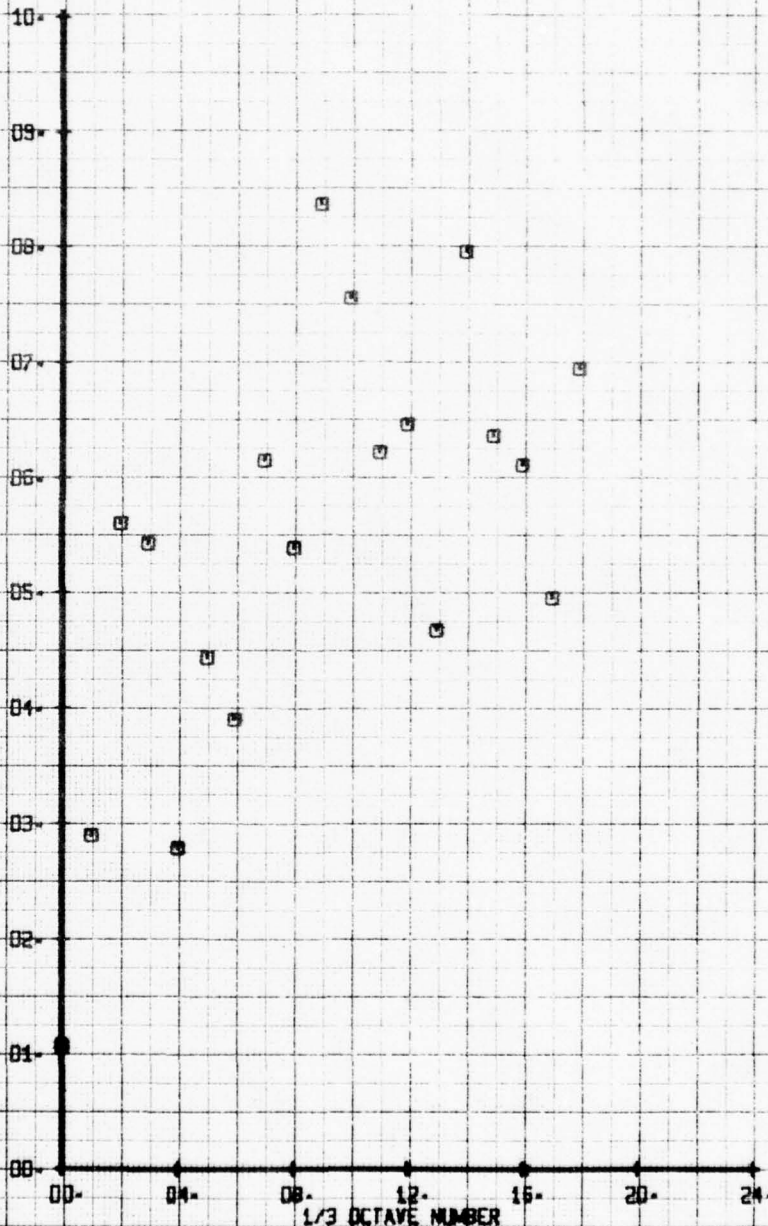
SYM CH
 □ 65
 LEGEND
 PARAMETER
 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 6

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

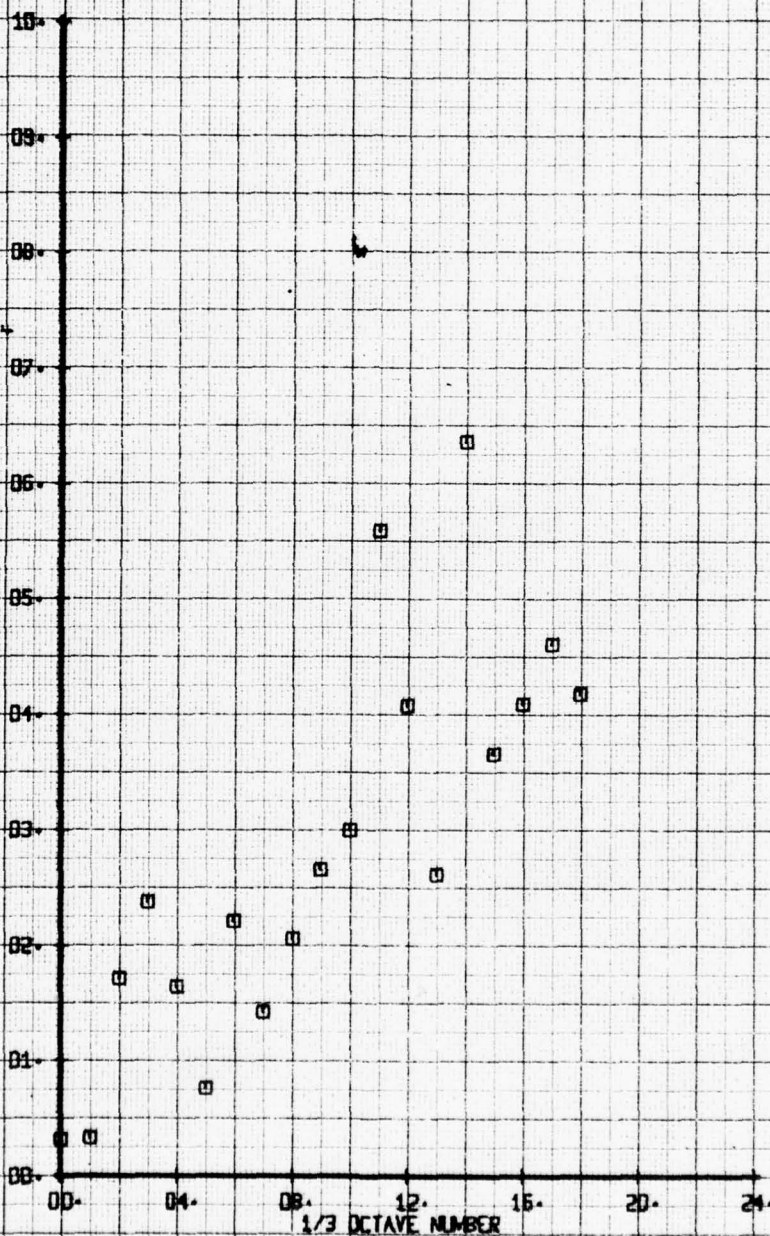
X-2 VELOCITY COMPONENT V-BETA FPS

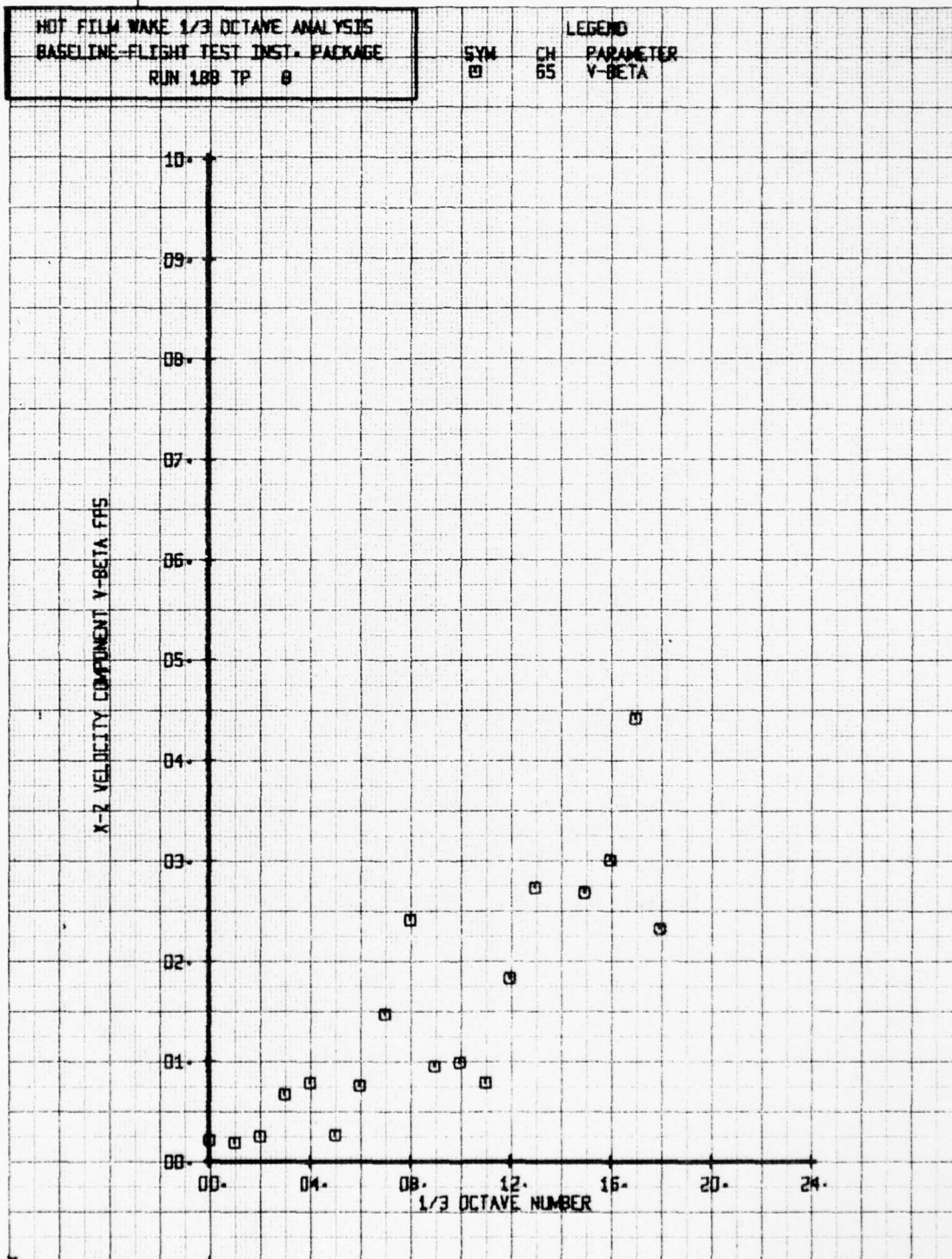


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 7

SYN CH PARAMETER
 0 65 Y-BETA

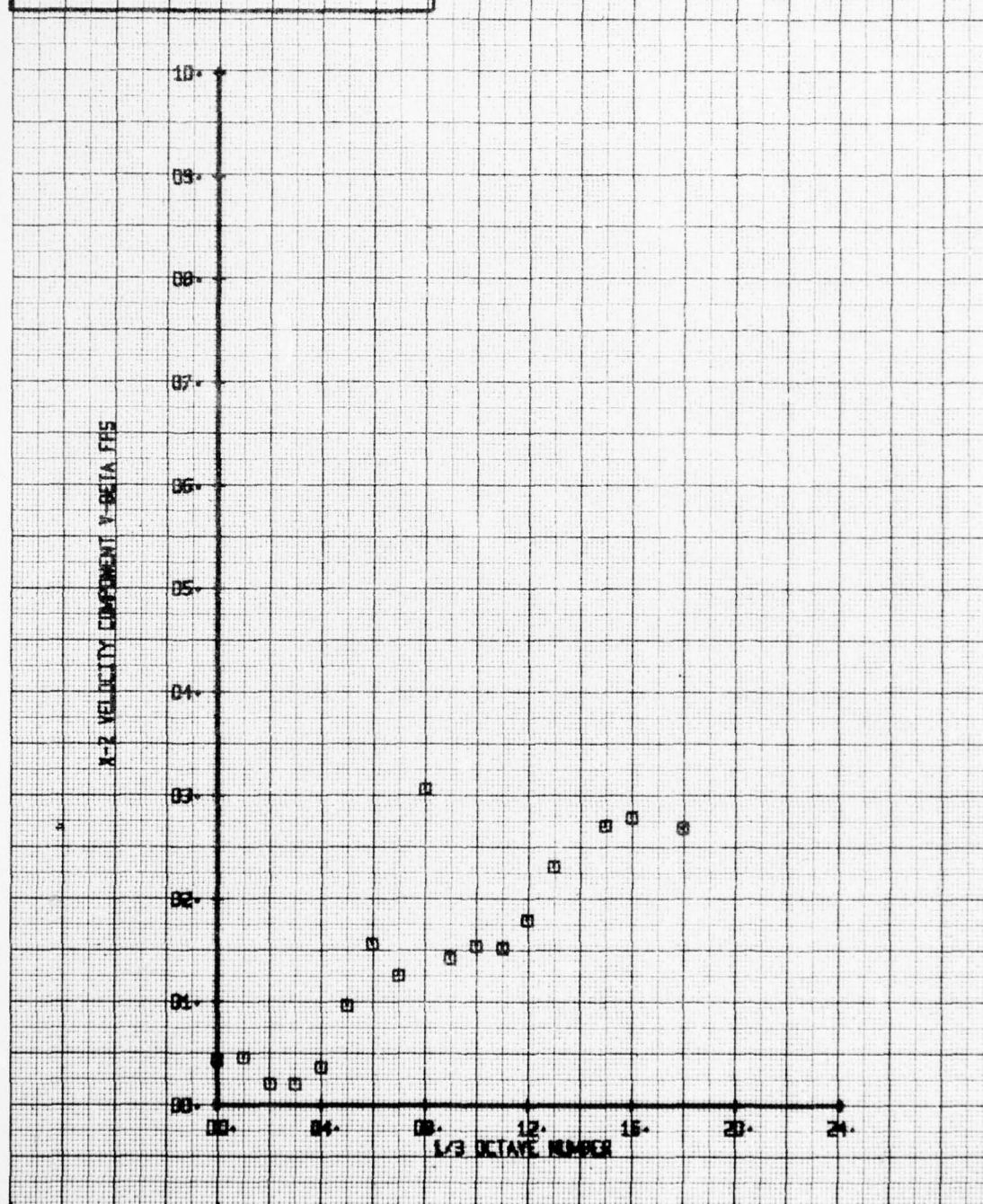
X-Z VELOCITY COMPONENT Y-BETA FFS





HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 9

SYM	CH	PARAMETER
□	65	V-BETA



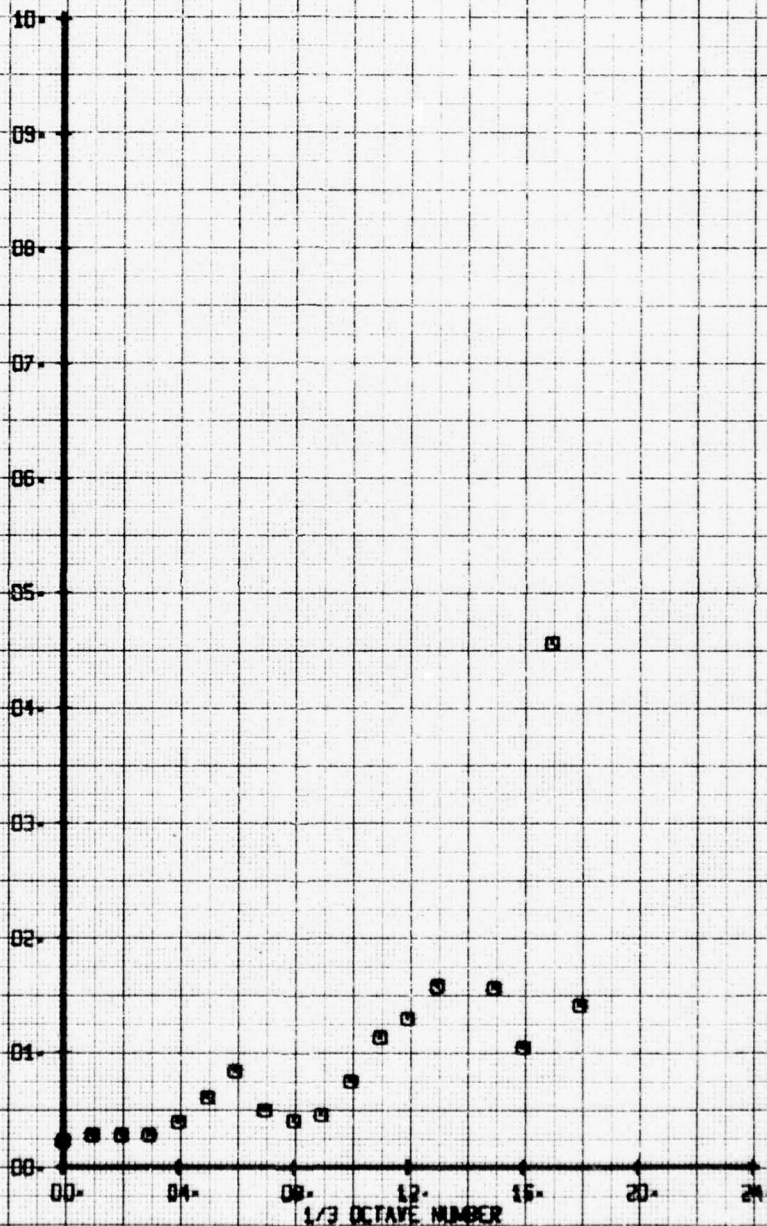
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 BASELINE-FLIGHT TEST INST. PACKAGE
 RUN 188 TP 10

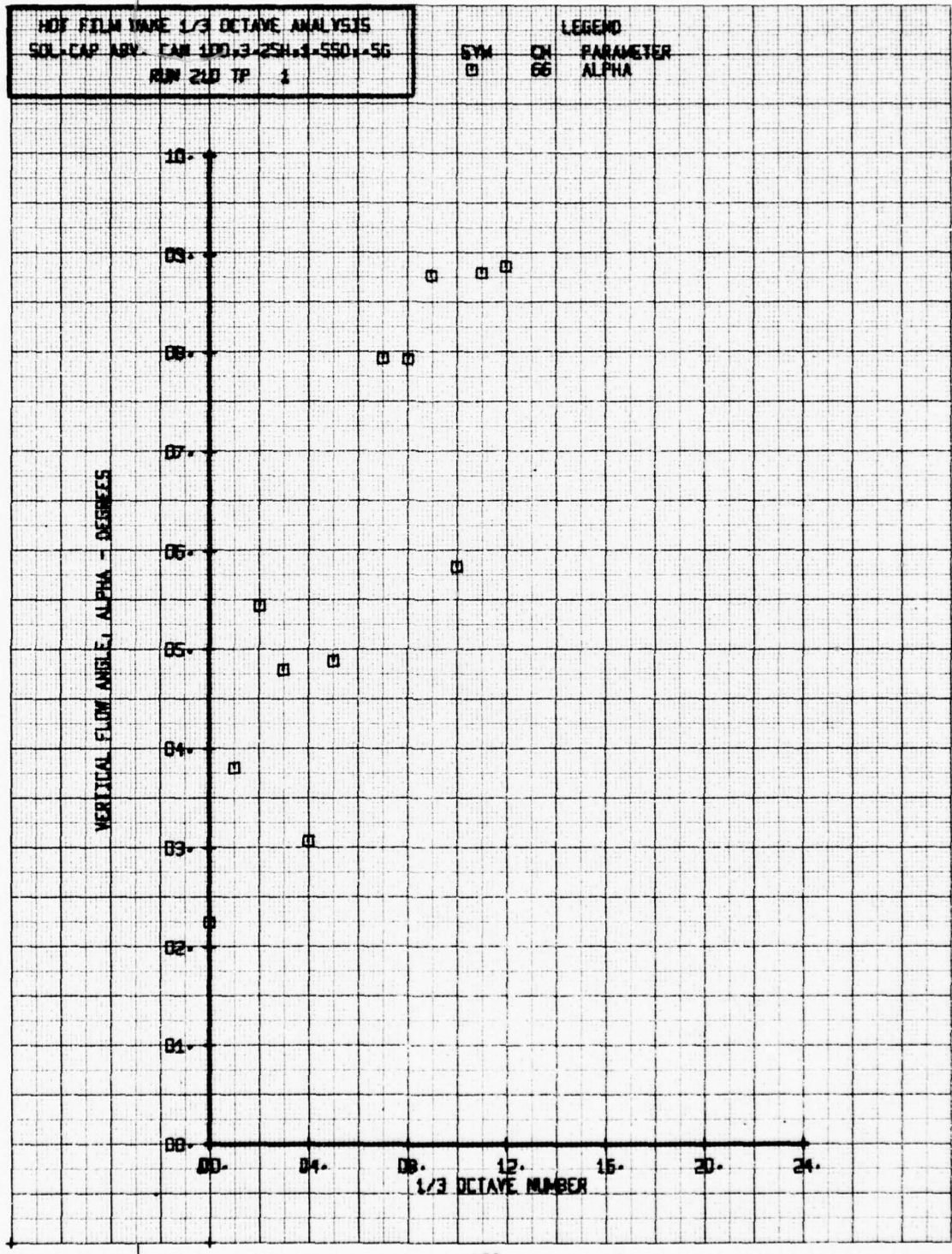
SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

X-2 VELOCITY COMPONENT V-BETA FHS

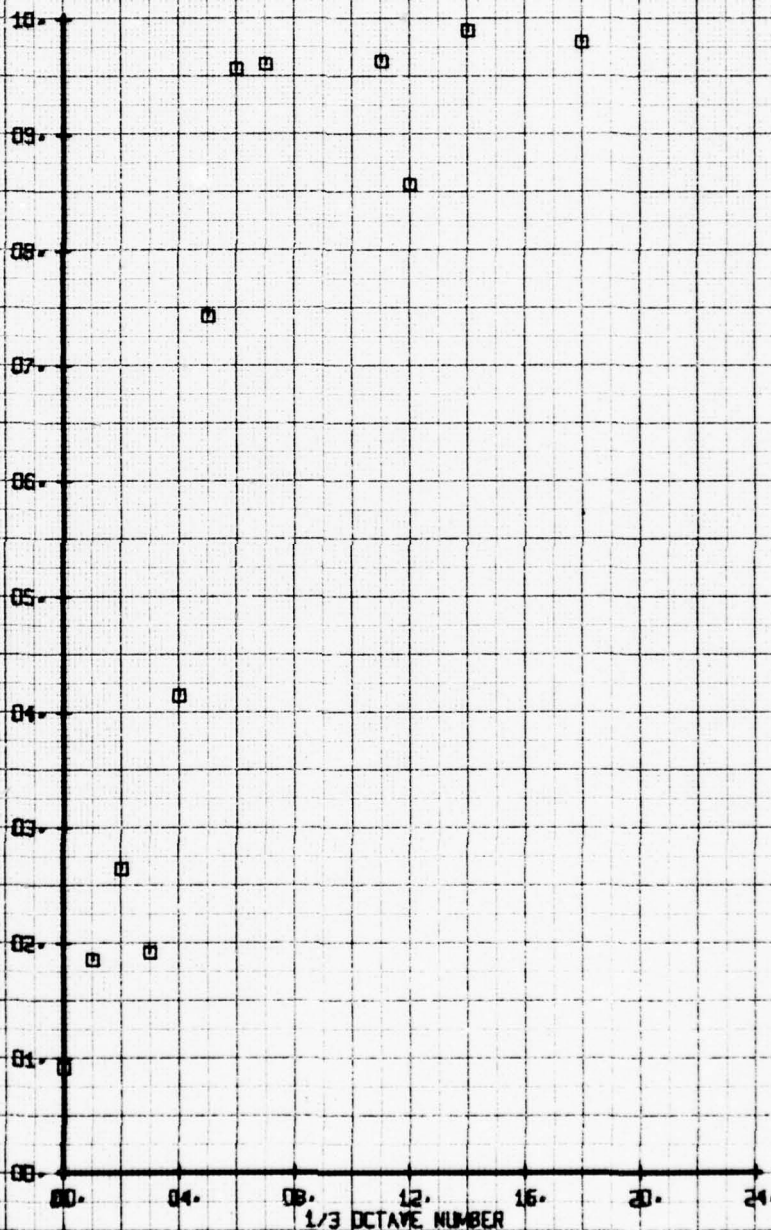




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN. 7-60-2-4H-7D-5G
 RUN 208 TP 2

SYN CH
 66 66
 PARAMETER
 ALPHA

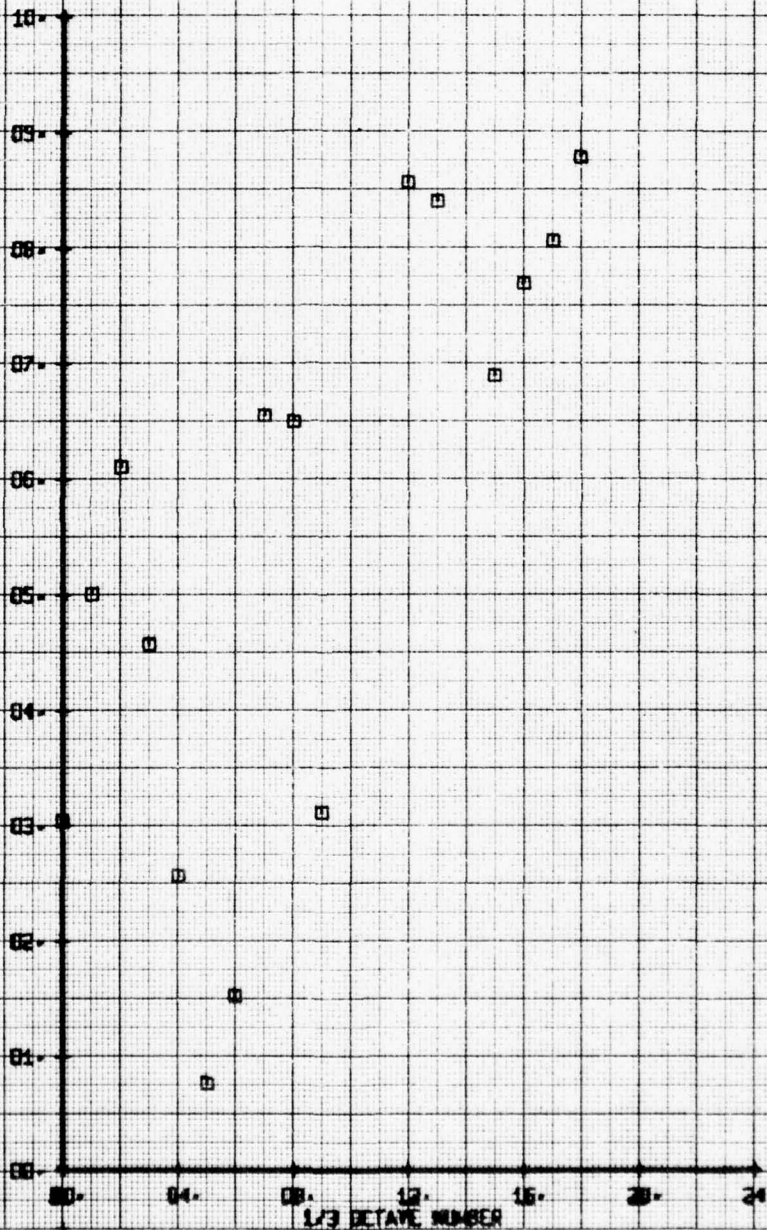
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN. 7.60.2.4H.7D.5G
 RUN 208 TP 3

SYN CH
 0 66
 PARAMETER
 ALPHA

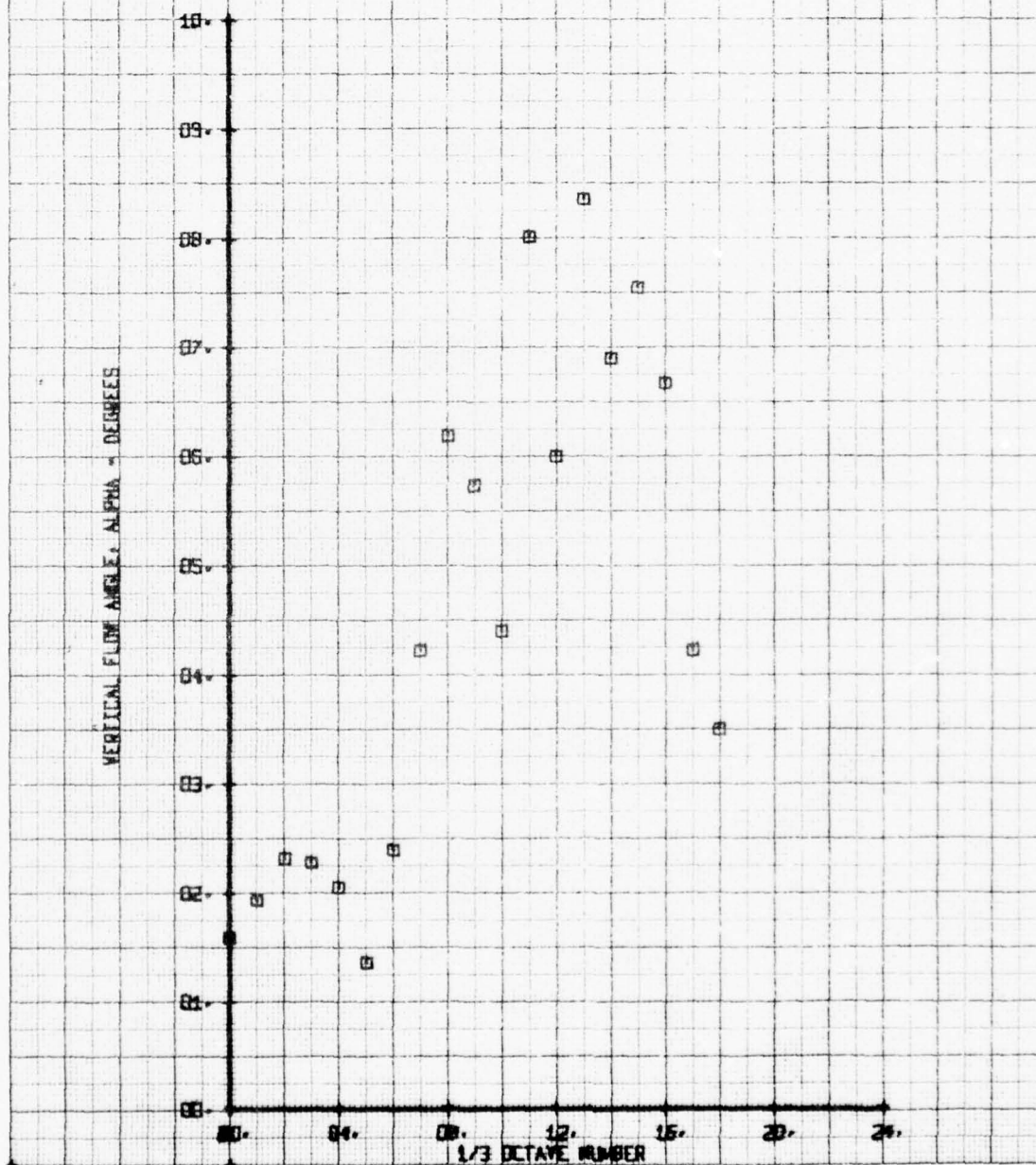
VERTICAL FLOW ANGLE, ALPHA - DEGREES

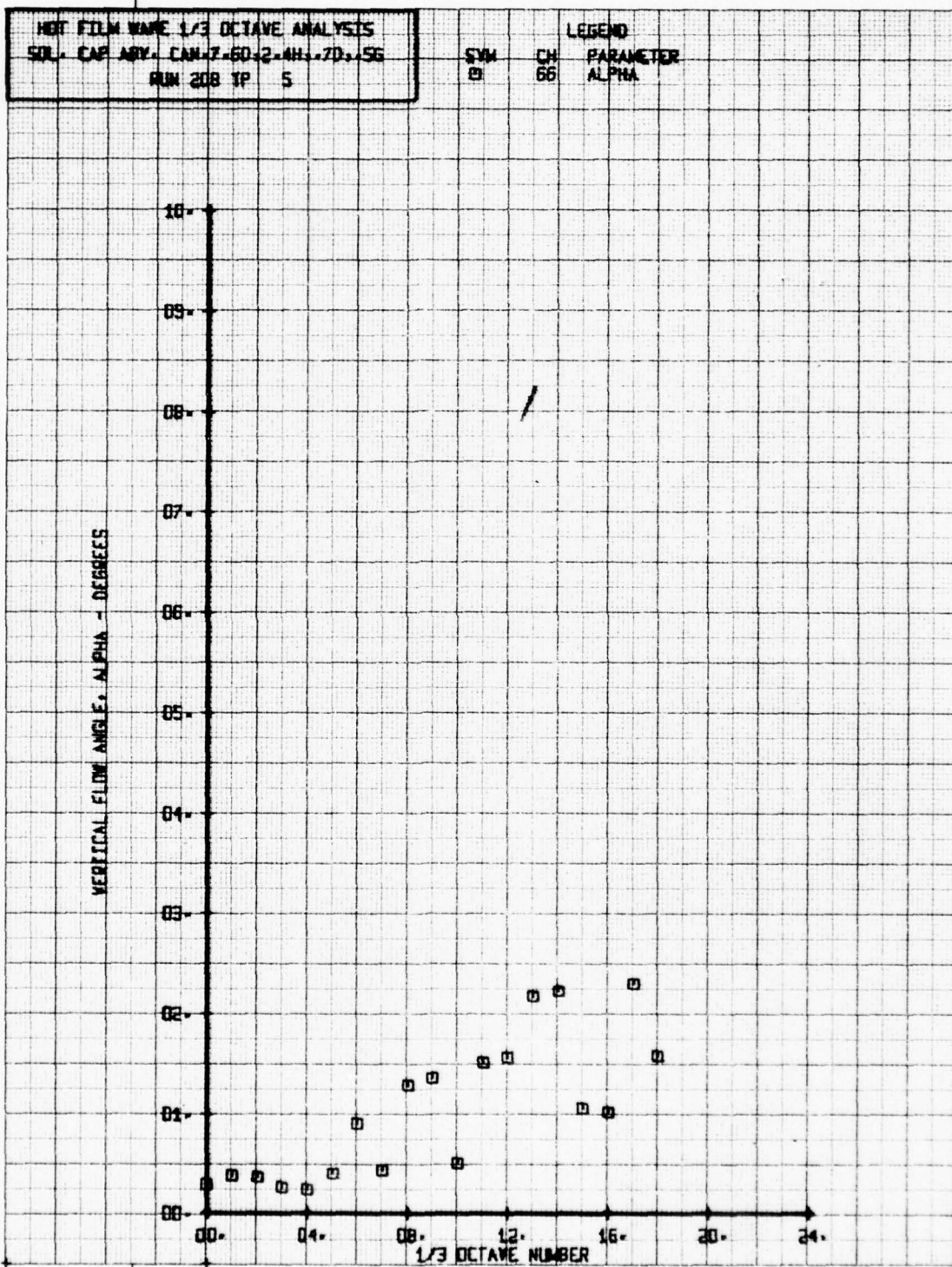


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABY. CAM. 7.60, 2.4H, 7D, 5G
 RUN 208 TP 4

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

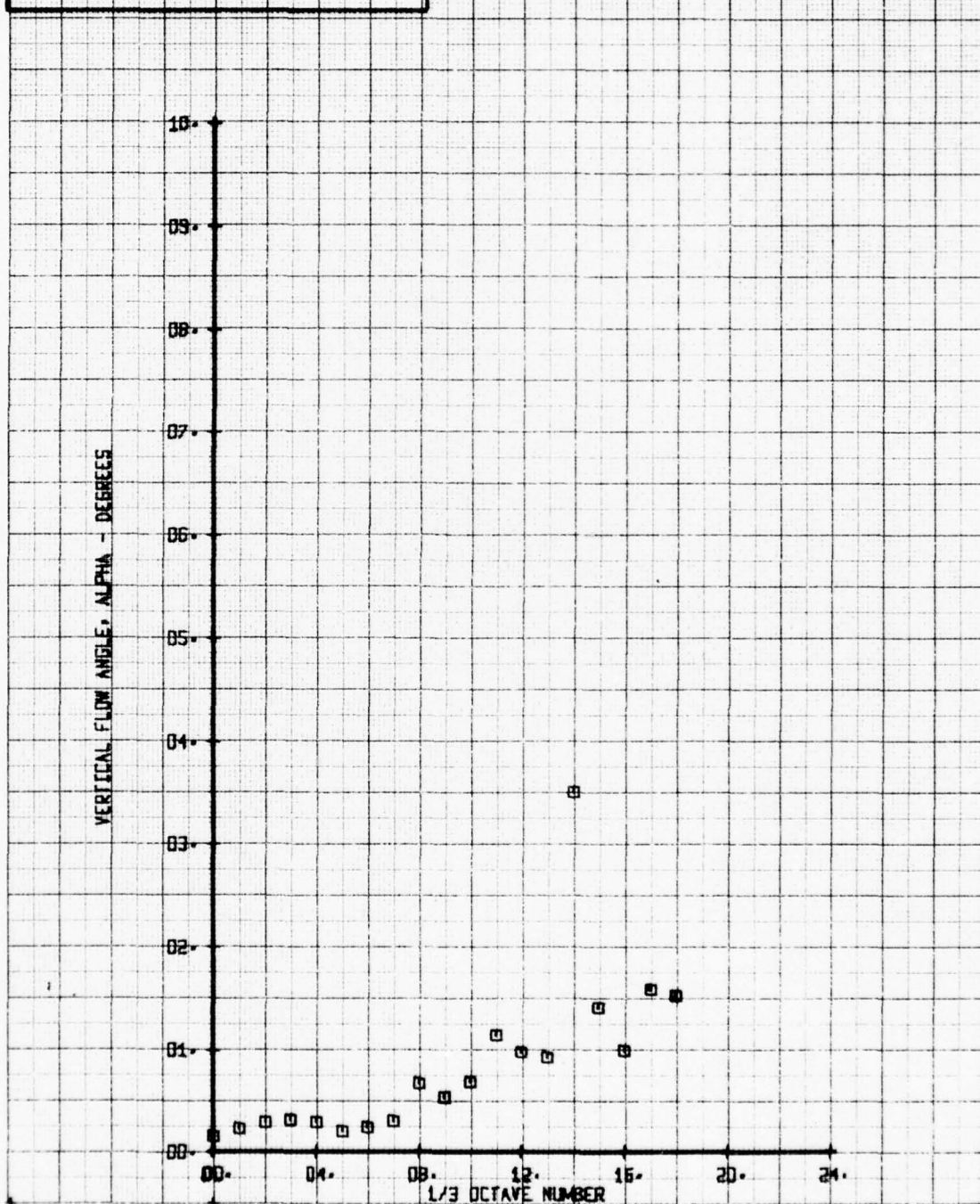
VERTICAL FLOW ANGLE, ALPHA - DEGREES





HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN. 7-60-2-4H-70-56
 RUN 208 TP 6

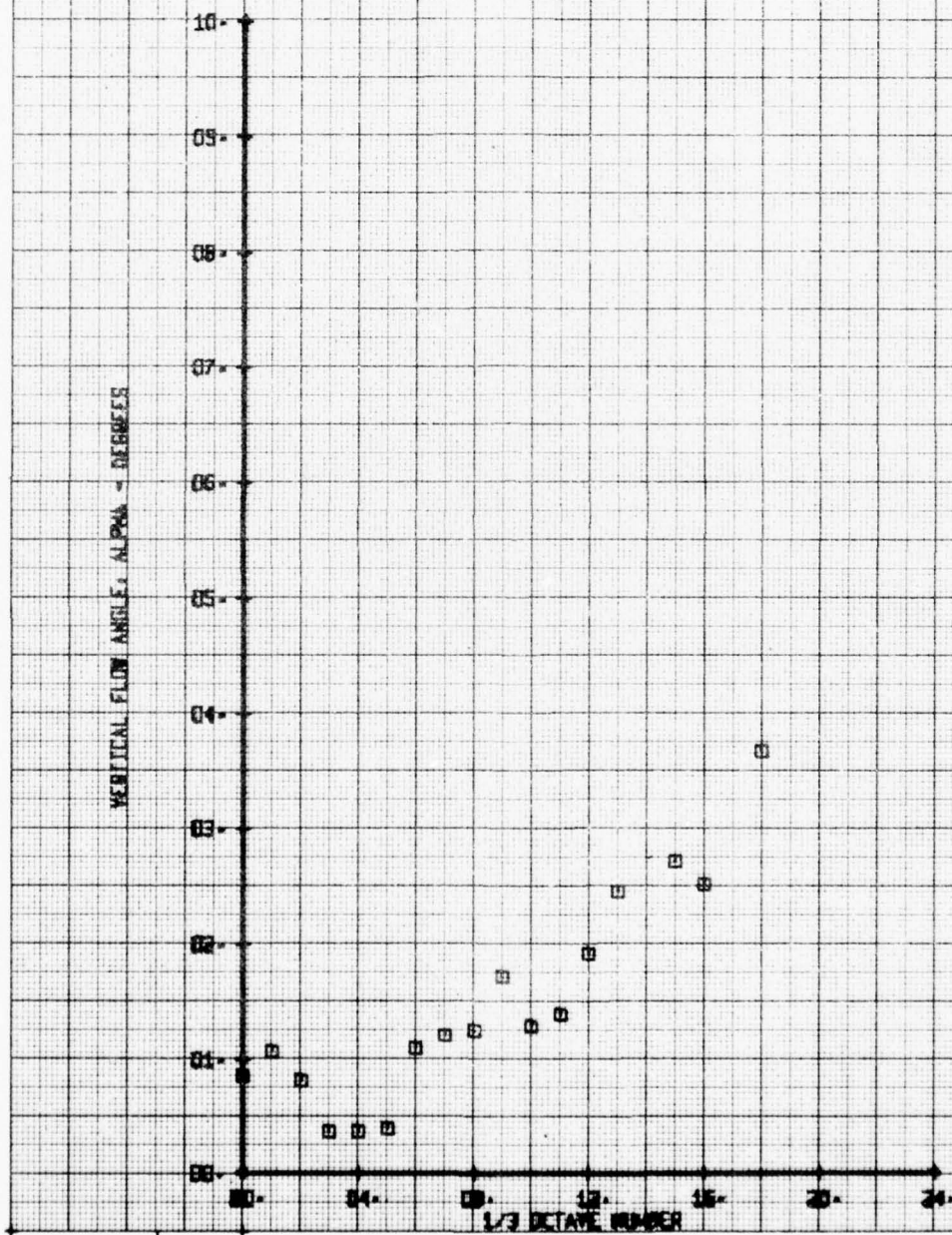
LEGEND
 CH 66
 PARAMETER
 ALPHA



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN-7-60-2-4H-70-5G
 RUN 208 TP 7

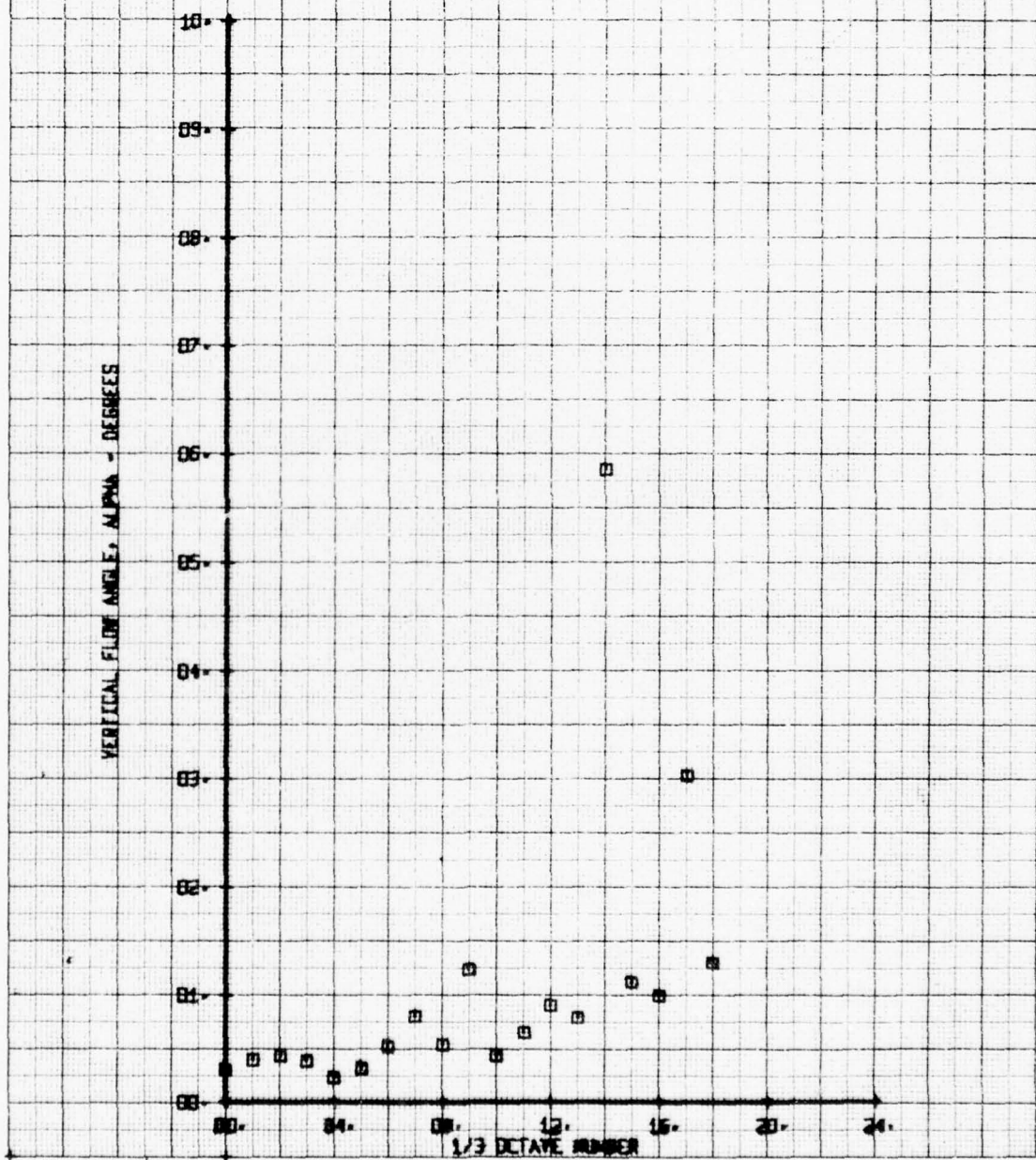
SYN CH
 0 66
 LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN. 7-60-2-4H-7D-5G
 RUN 208 TP 8

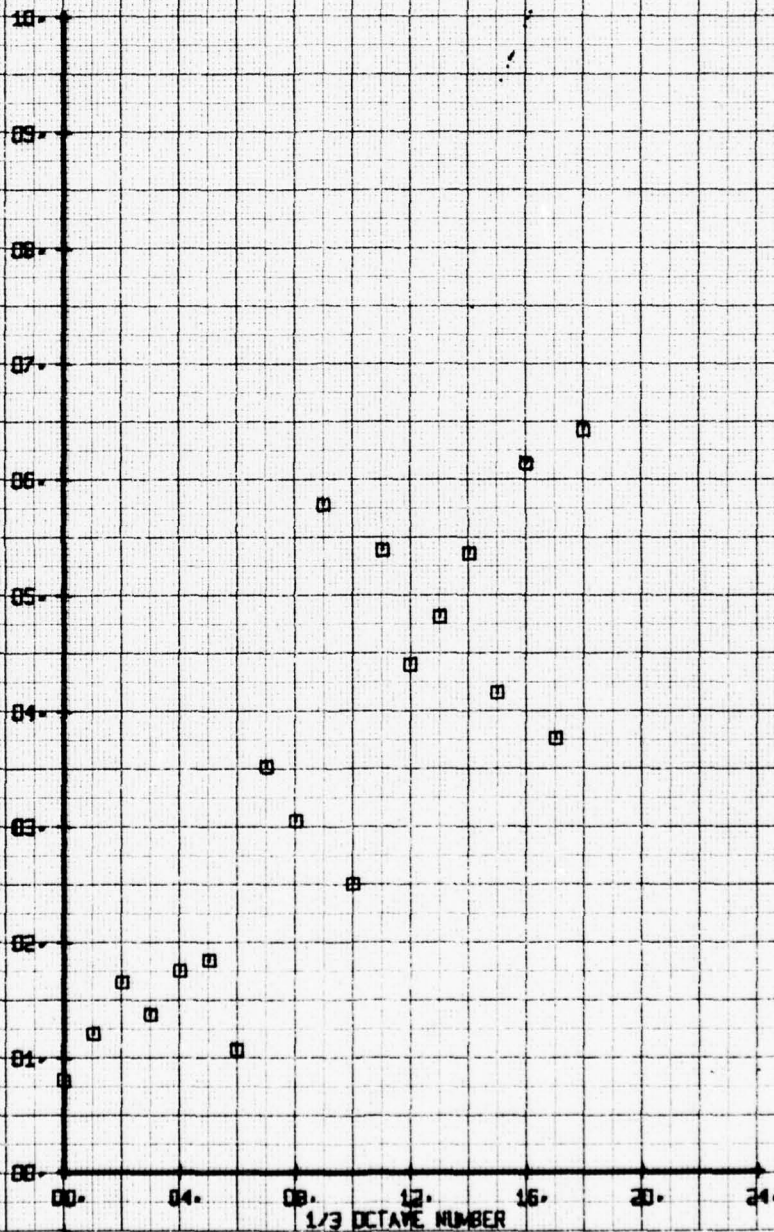
LEGEND
 CH. 66
 PARAMETER
 ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN. 7.60.2.4H. 70.5G
 RUN 208 TP 2

LEGEND
 SYM CH PARAMETER
 □ 65 BETA

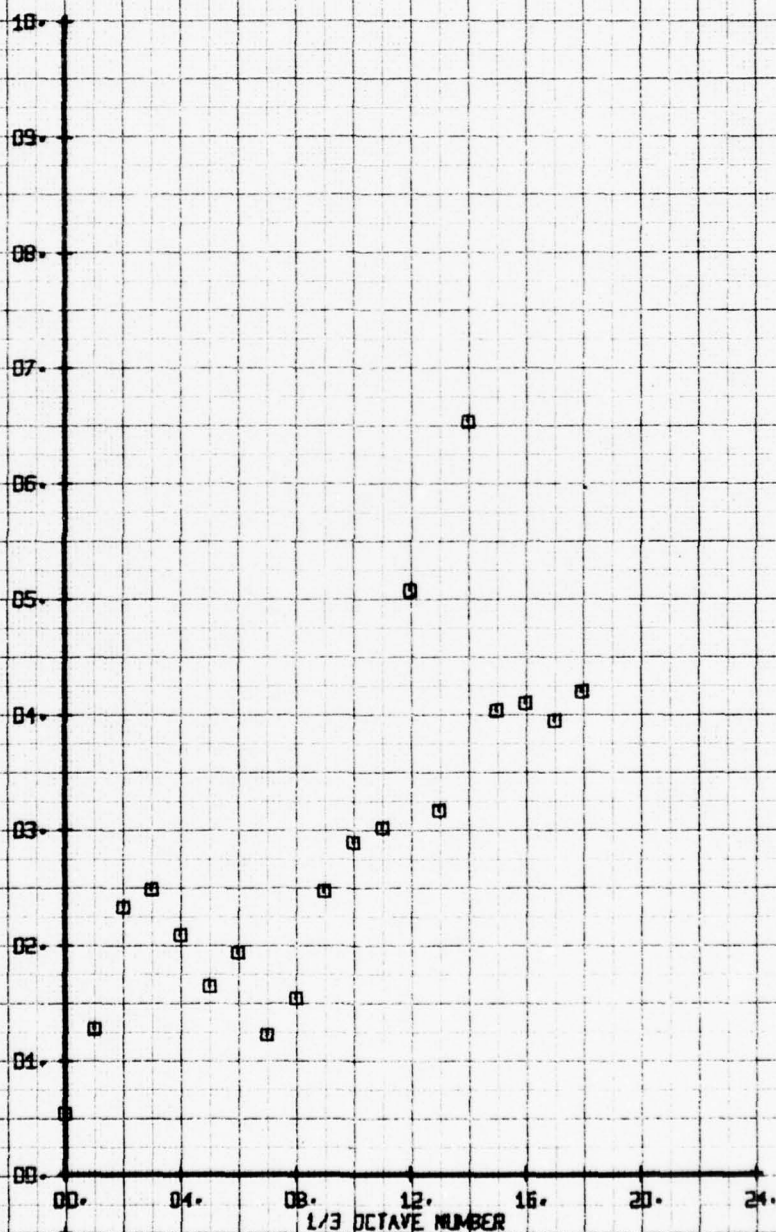
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN. 7-60-2-4H-7D-5G
 RUN 208 TP 3

SYM CH
 □ 65
 LEGEND
 PARAMETER
 BETA

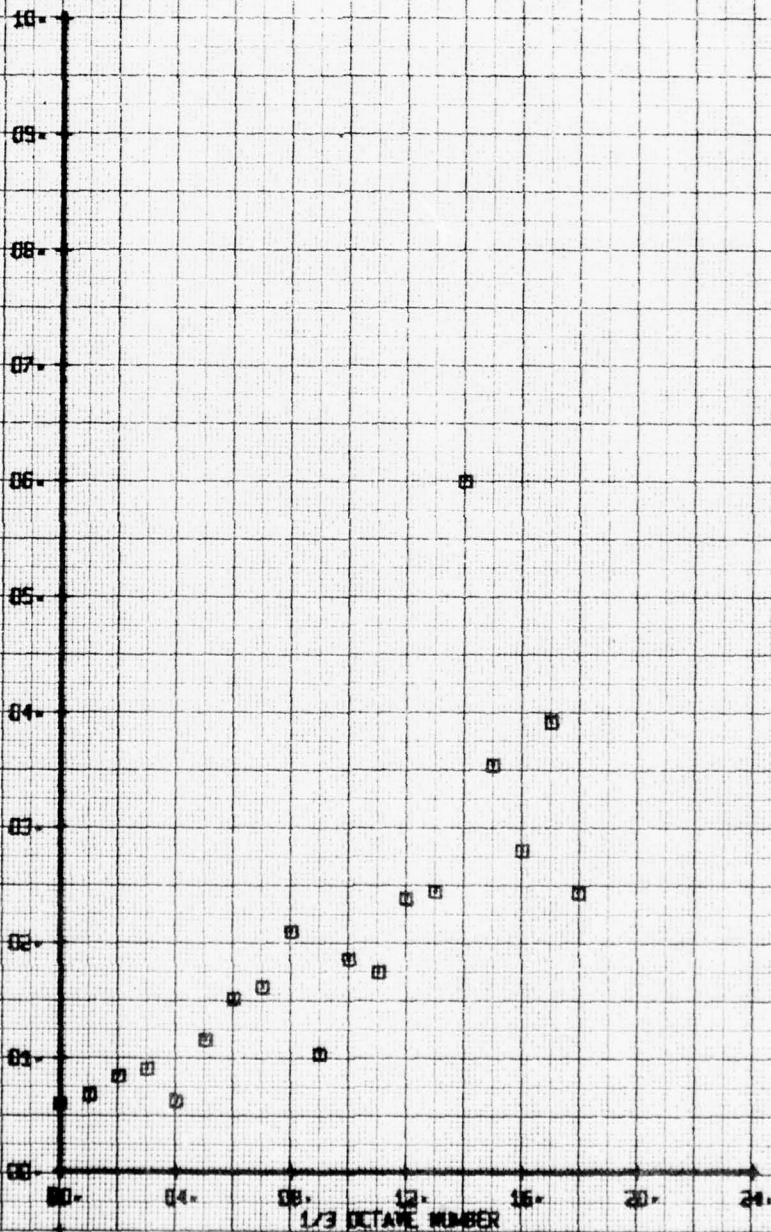
LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN-7-60-2-4H-70-56
 RUN 208 TP 4

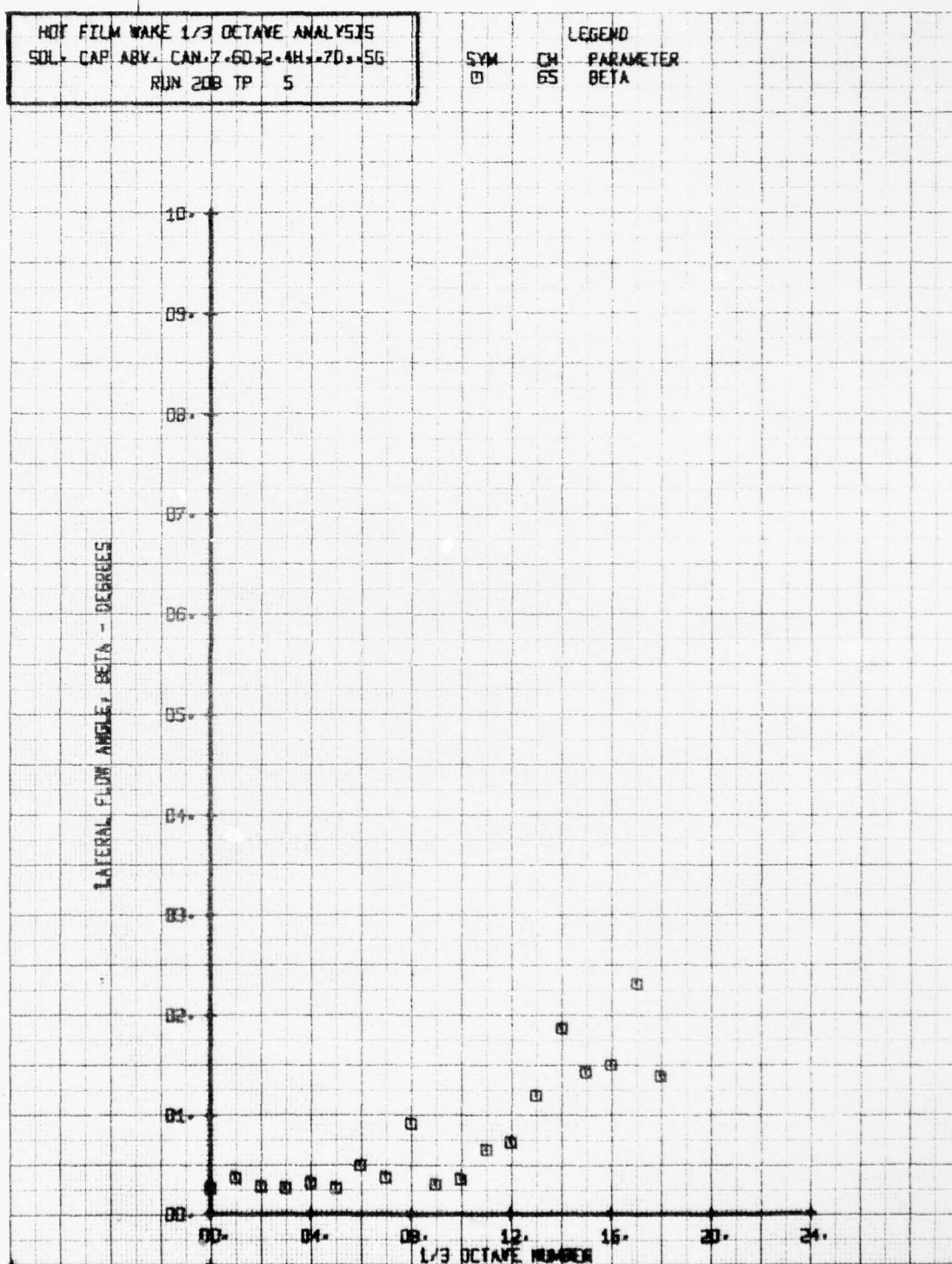
SYN CH
 0 65
 LEGEND
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN. 7.60, 2.4H, 7D, 5G
 RUN 20B TP 5

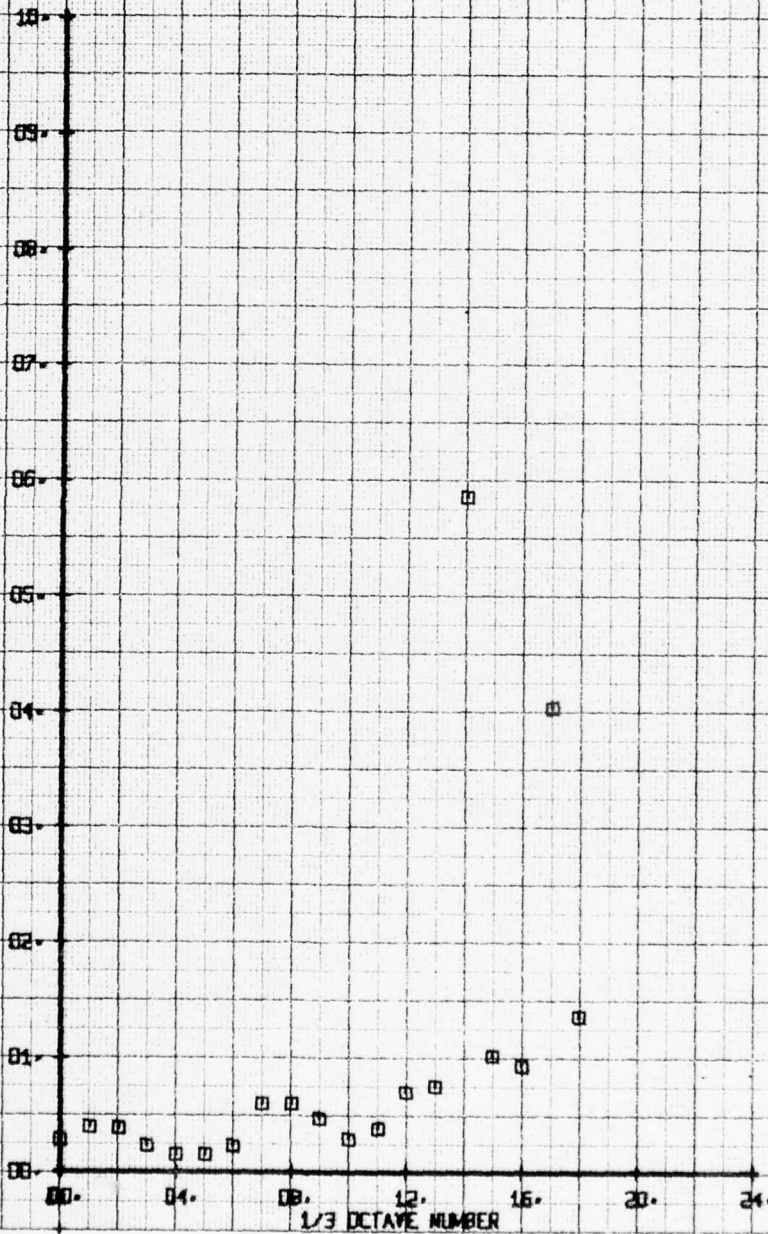
SYN CH PARAMETER
 0 65 BETA

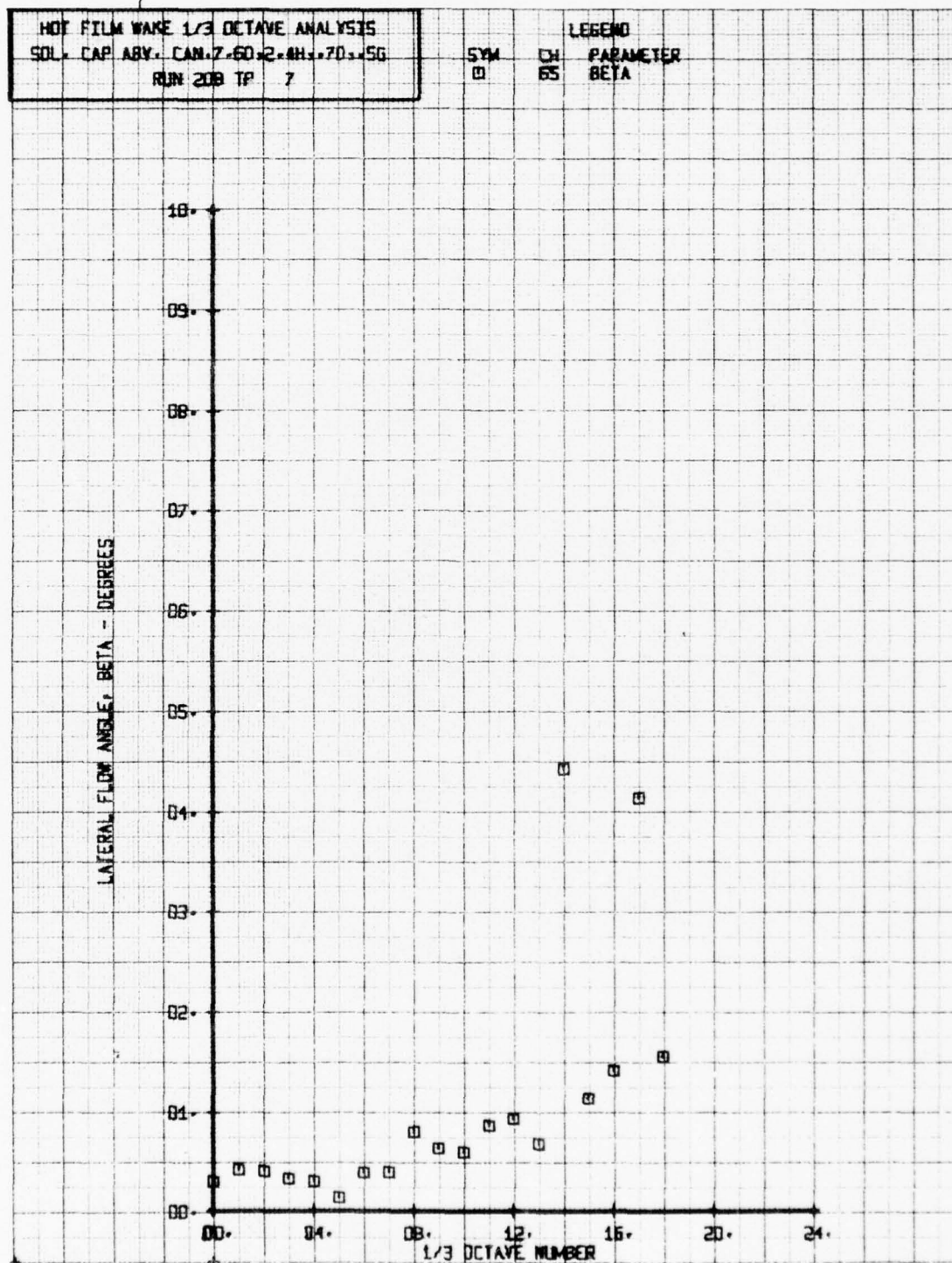


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN. 7-60-2-4H-70-5G
 RUN 208 TP 6

LEGEND
 CH PARAMETER
 65 BETA

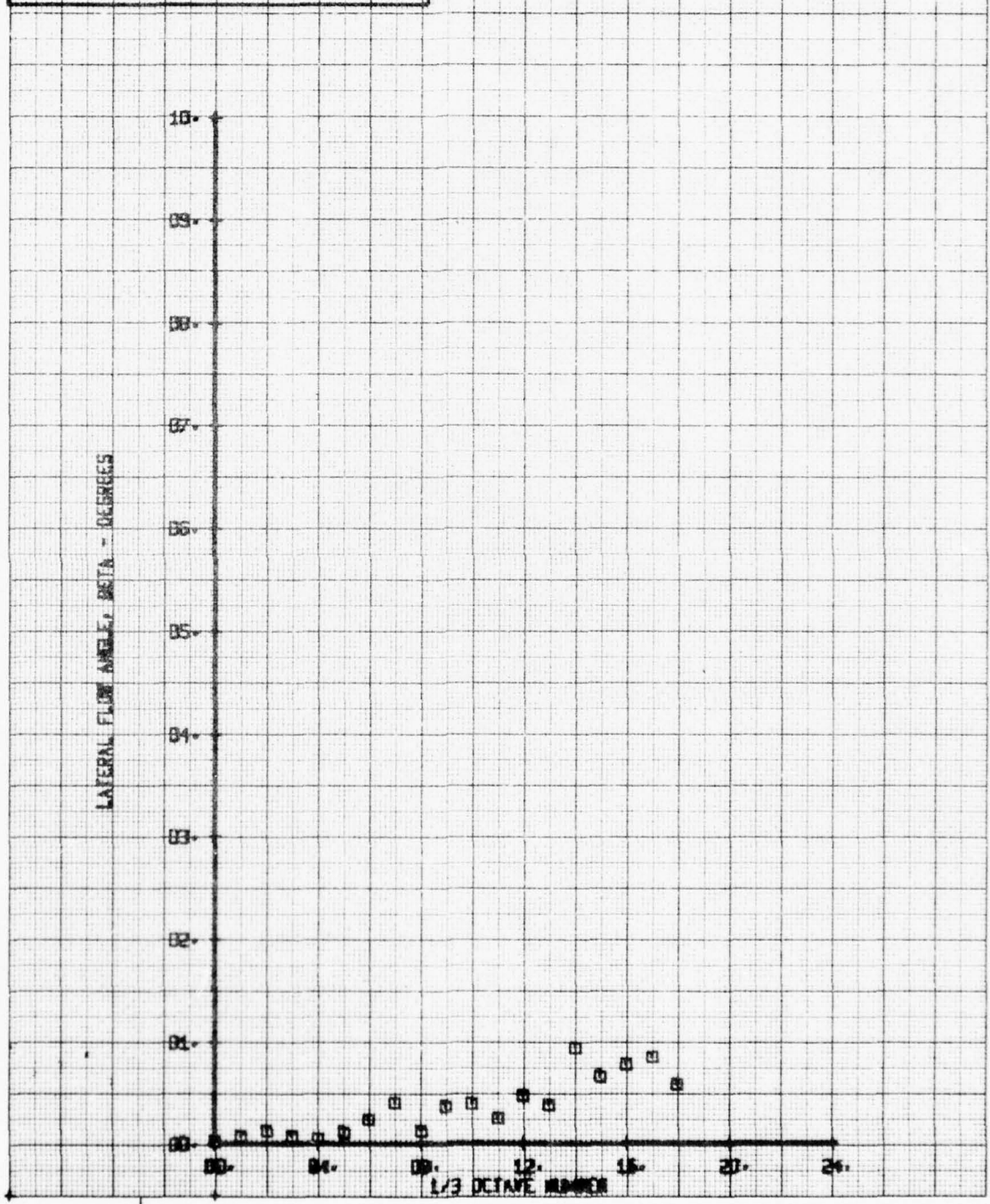
LATERAL FLOW ANGLE, BETA - DEGREES





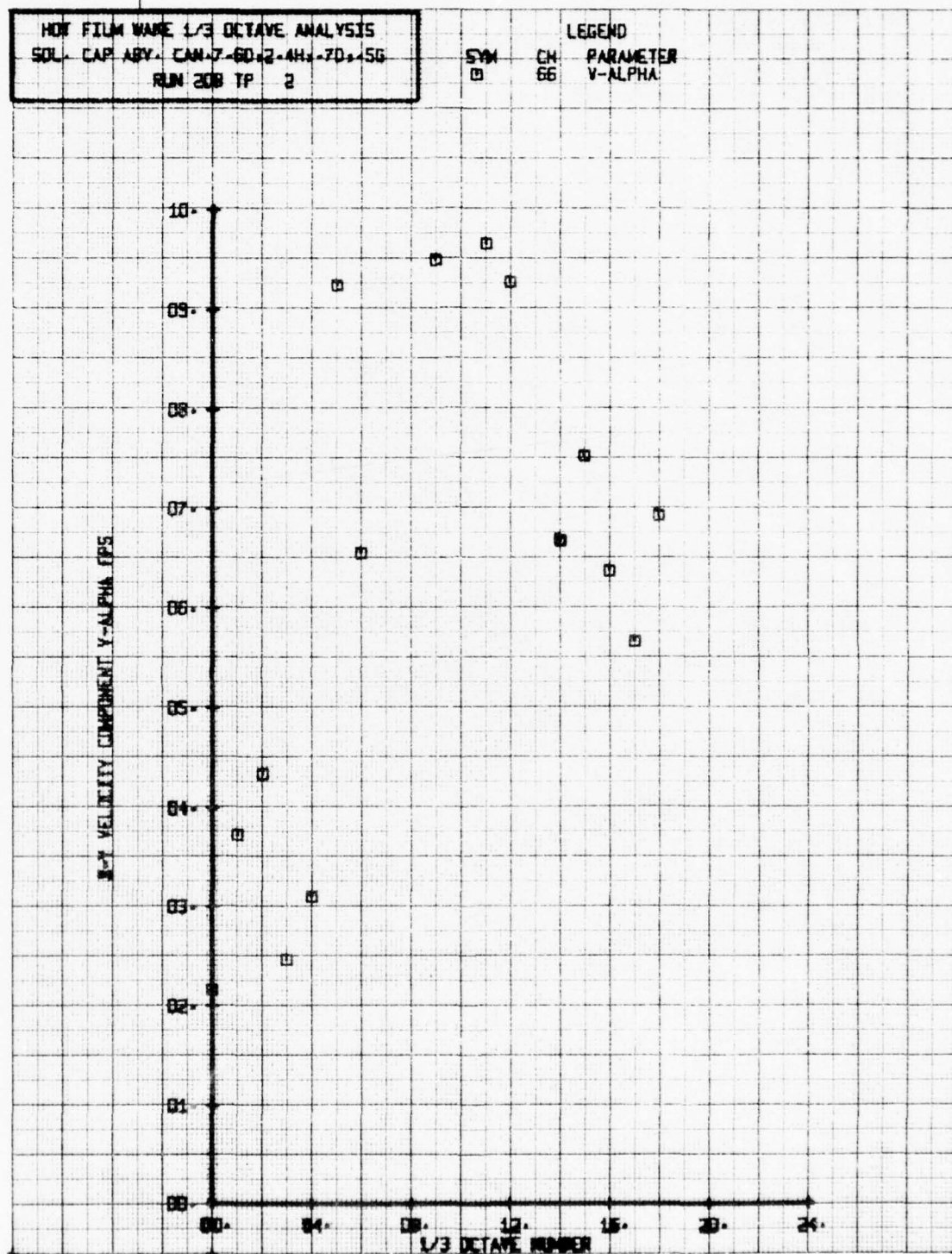
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABY. CAN. 7.60, 2.4H, 70.5G
 RUN 208 TP 8

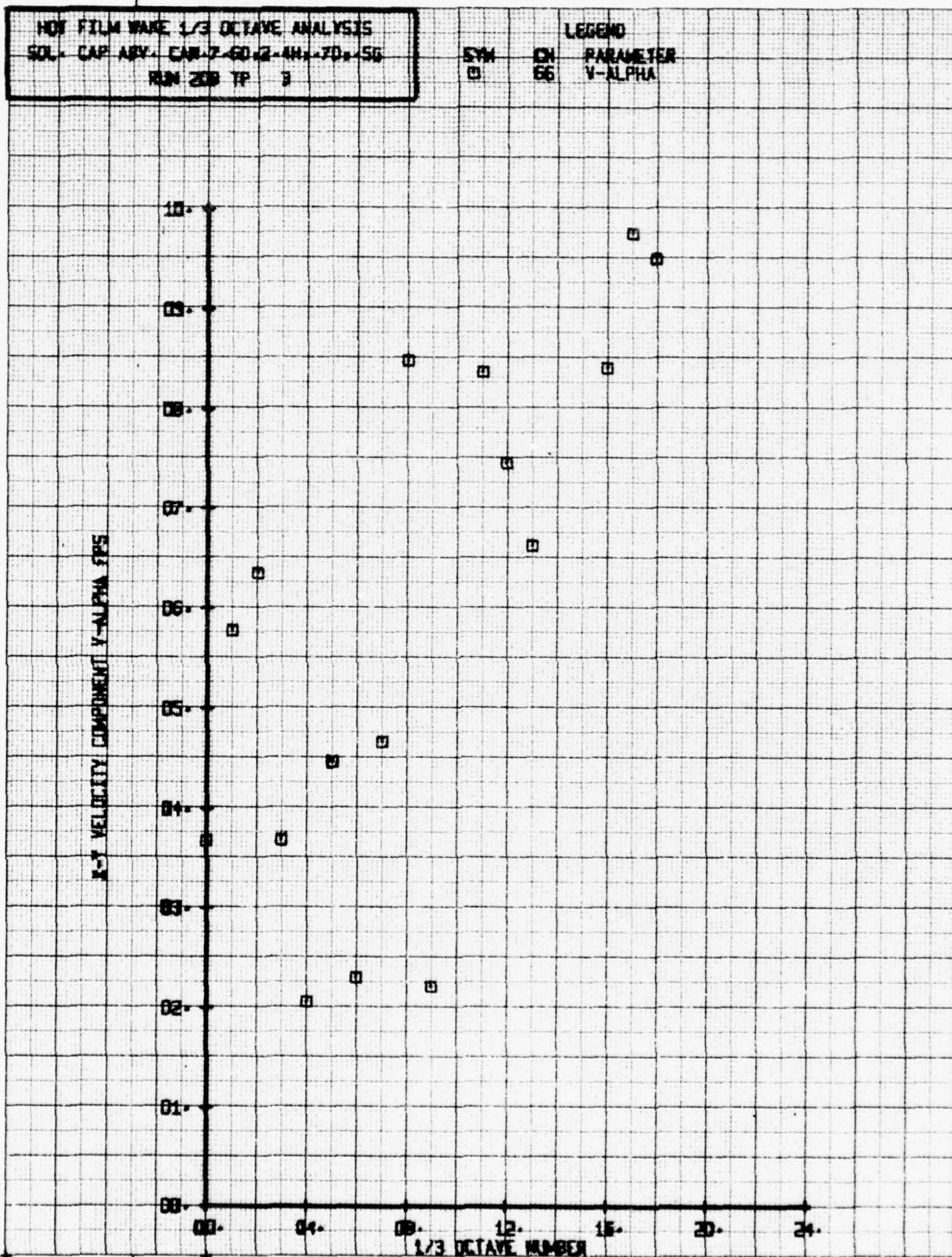
SYM CH PARAMETER
 0 65 BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY CAN-7-60-2-4H-7D-5G
 RUN 208 TP 2

SYM CH PARAMETER
 □ 66 V-ALPHA

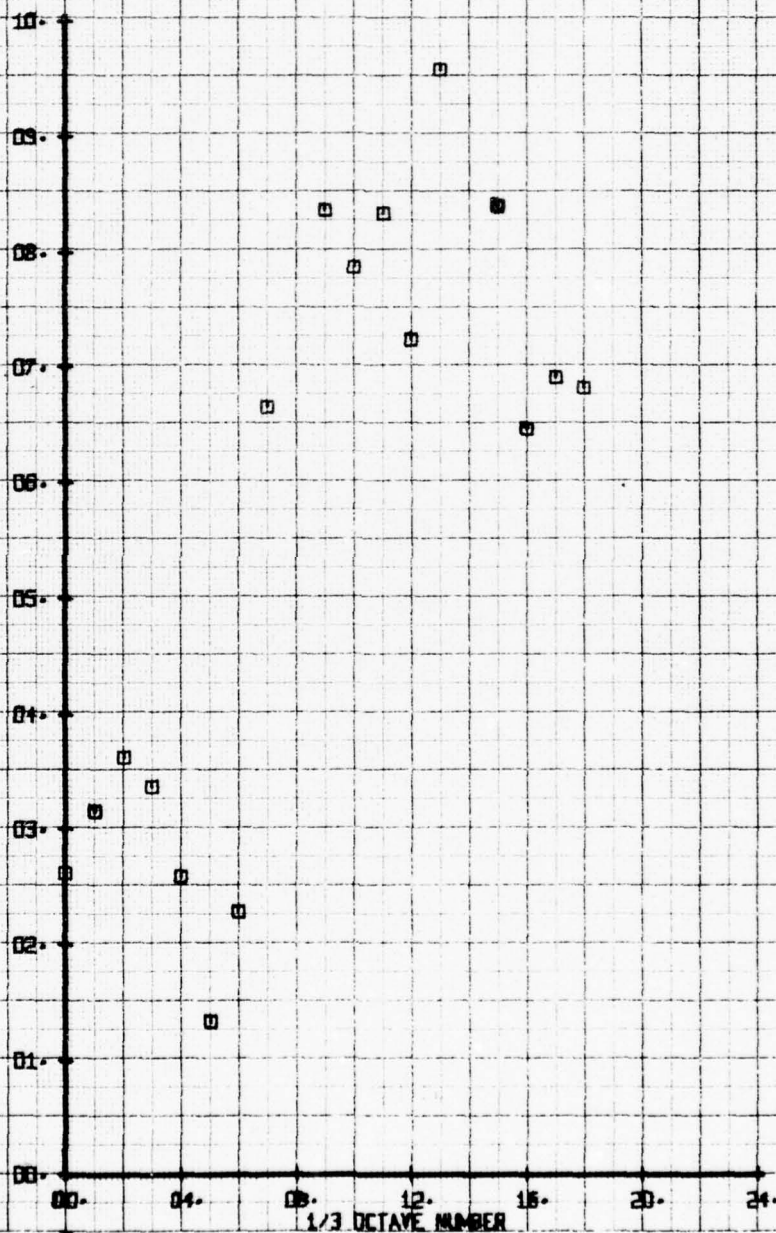


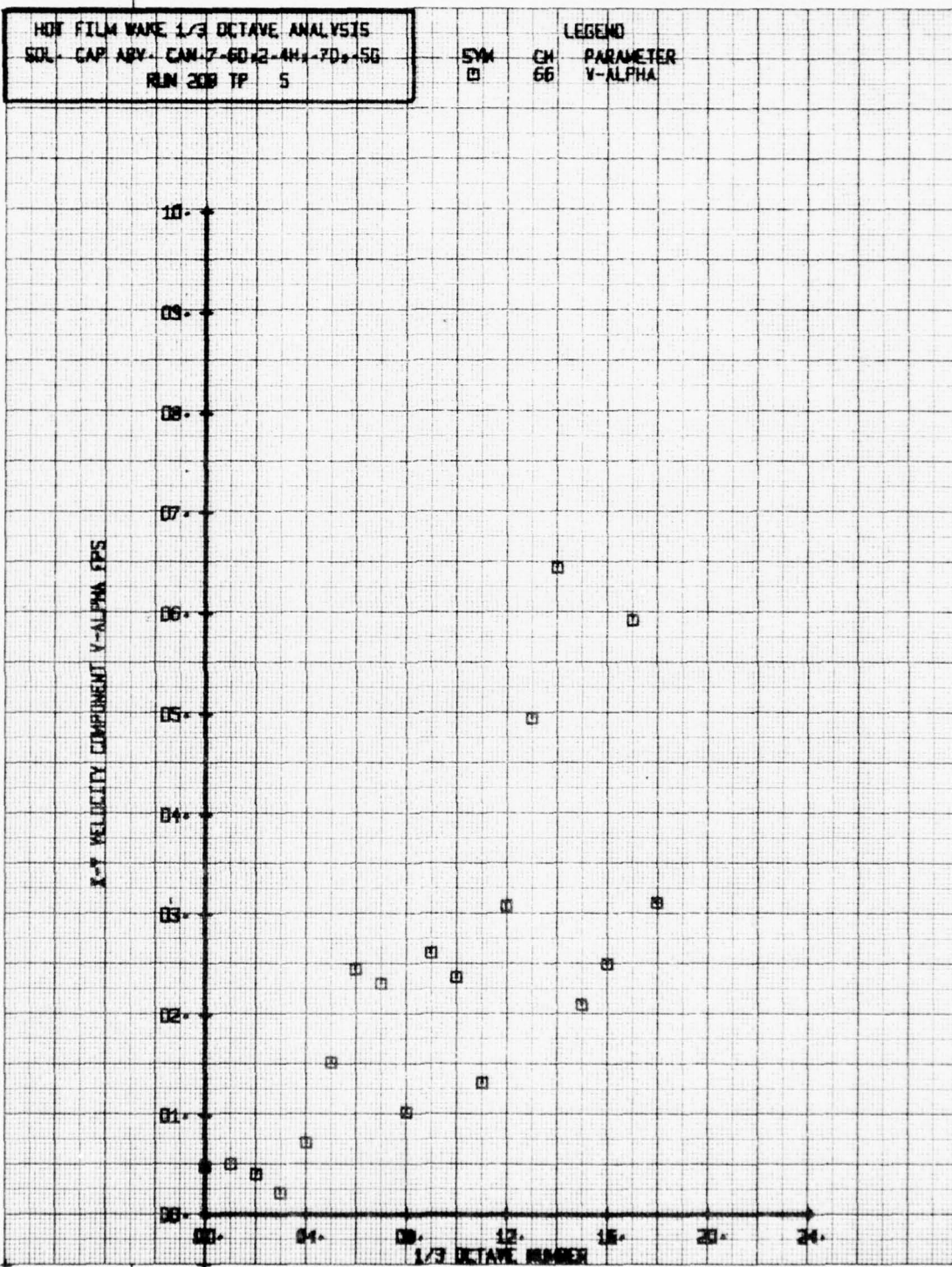


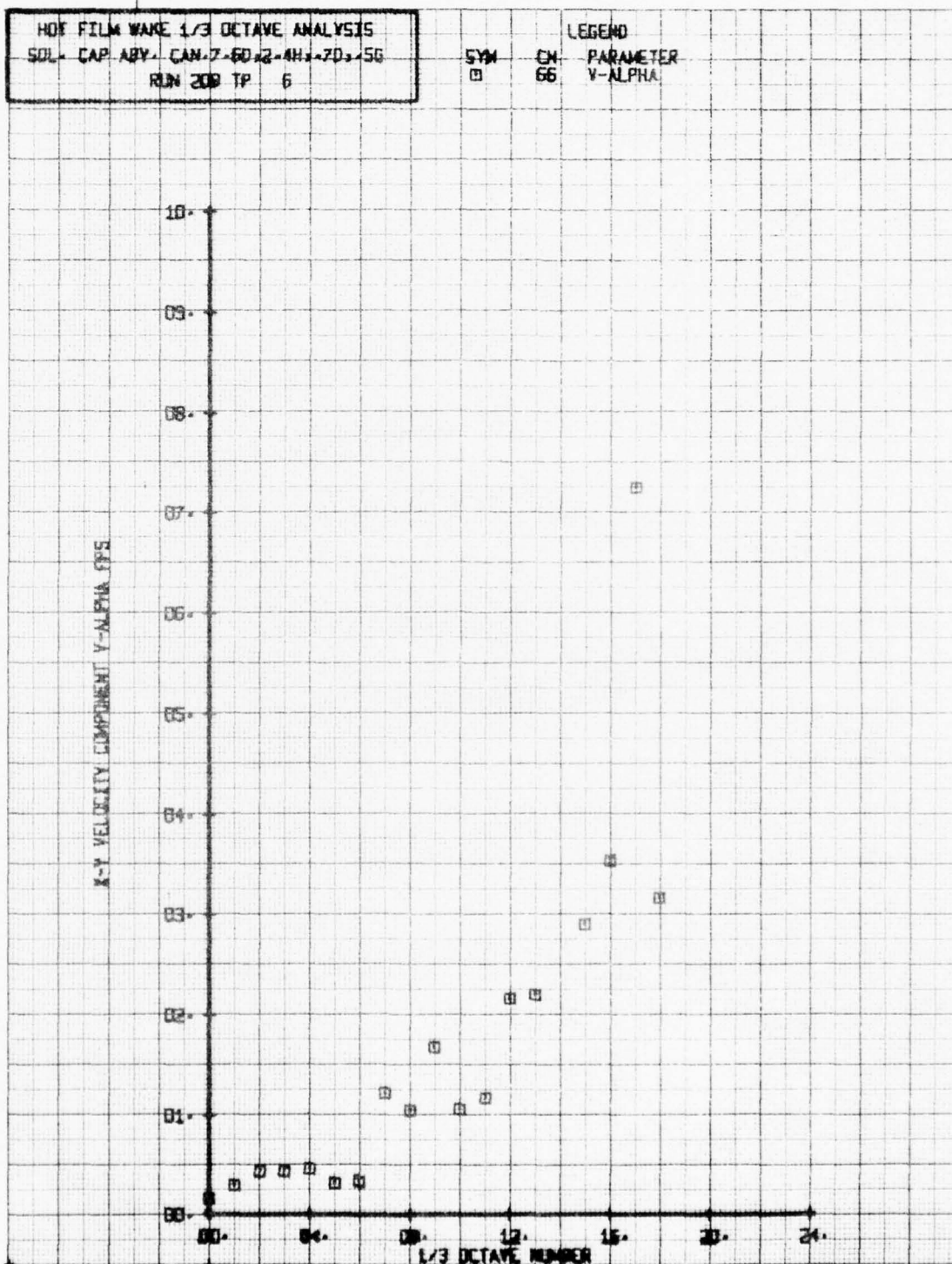
HOF FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY CAN-7-60-2-4H-7D-5G
 RUN 200 TP 4

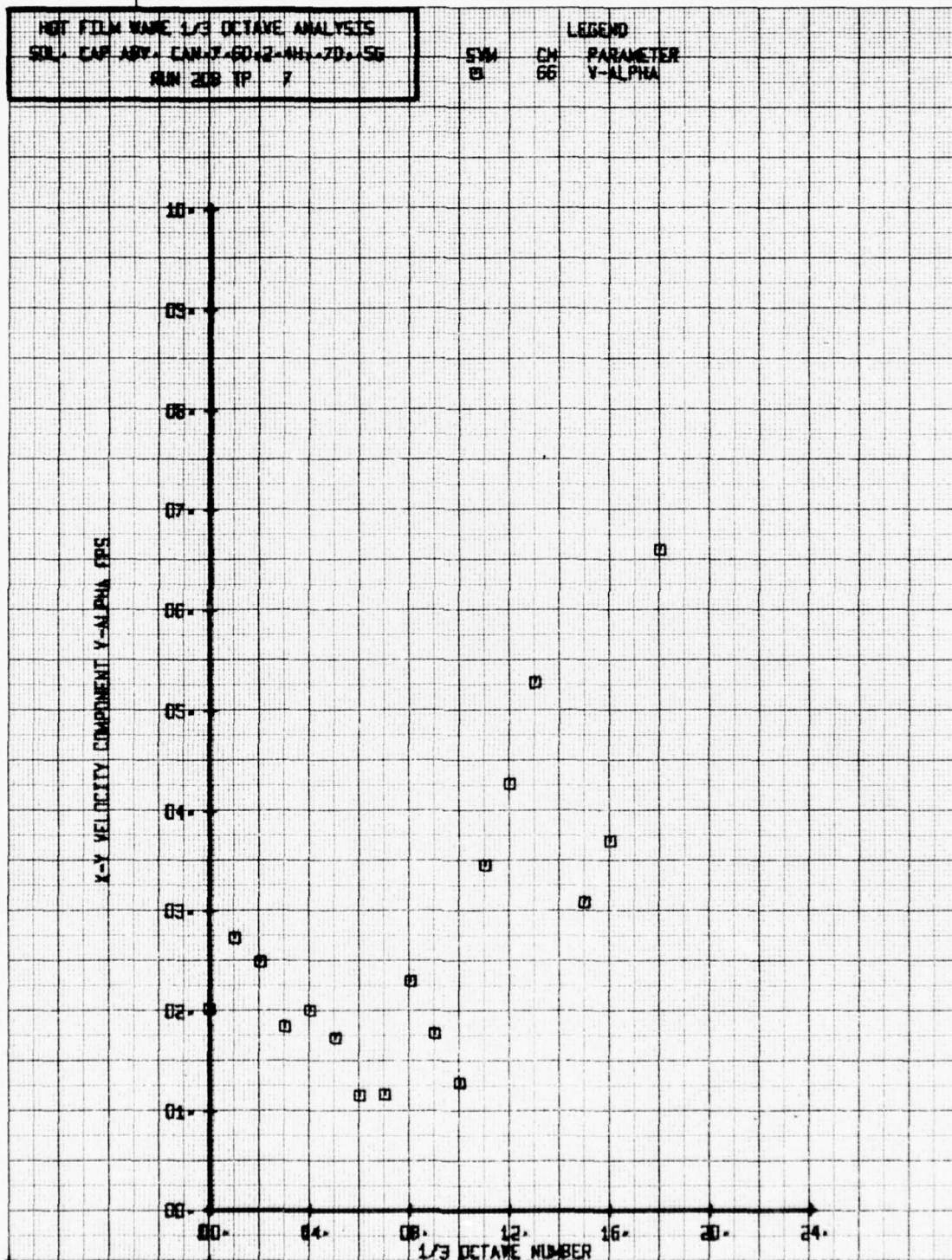
SYN CH
 0 66
 PARAMETER
 V-ALPHA

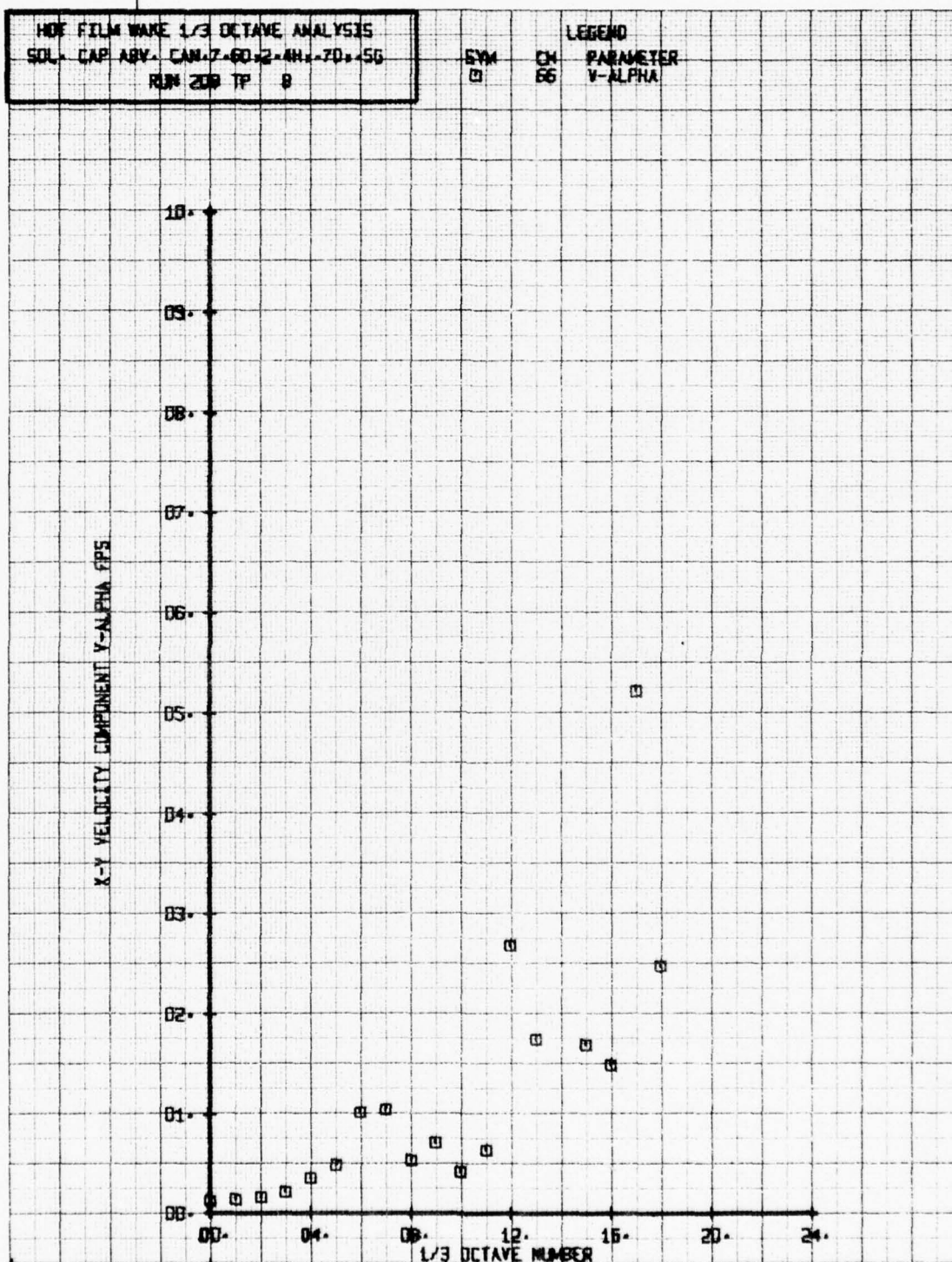
X-Y VELOCITY COMPONENT V-ALPHA FPS

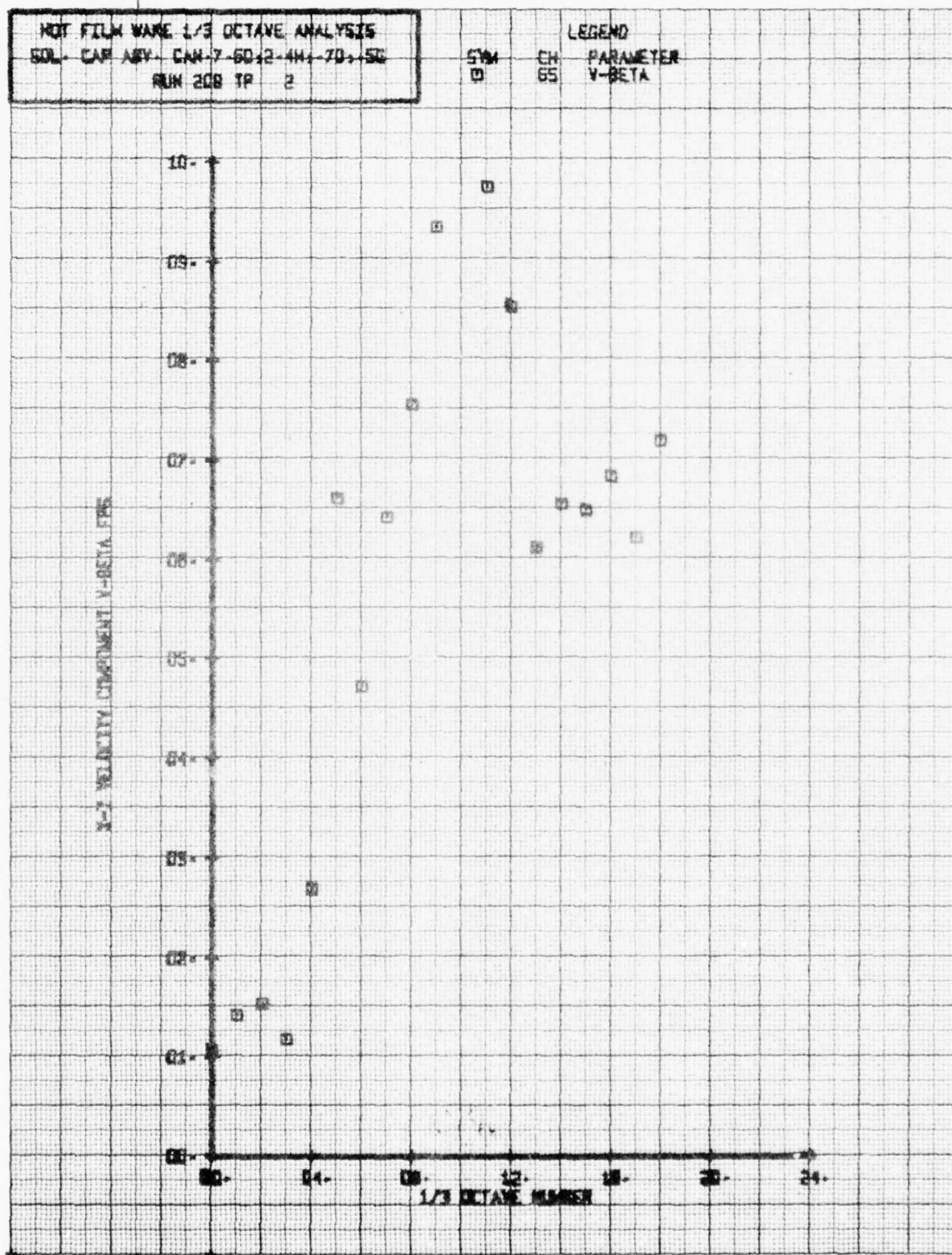






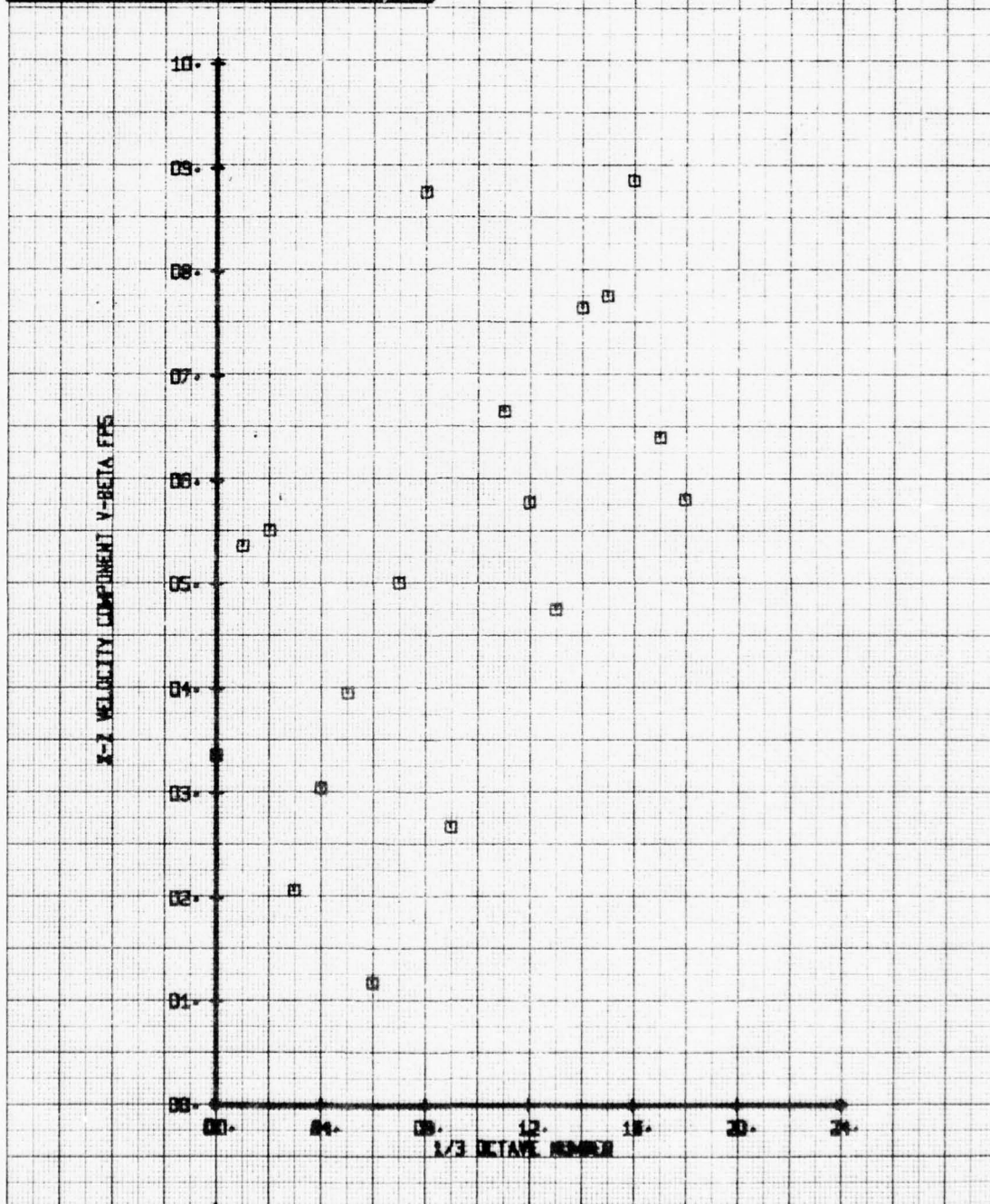


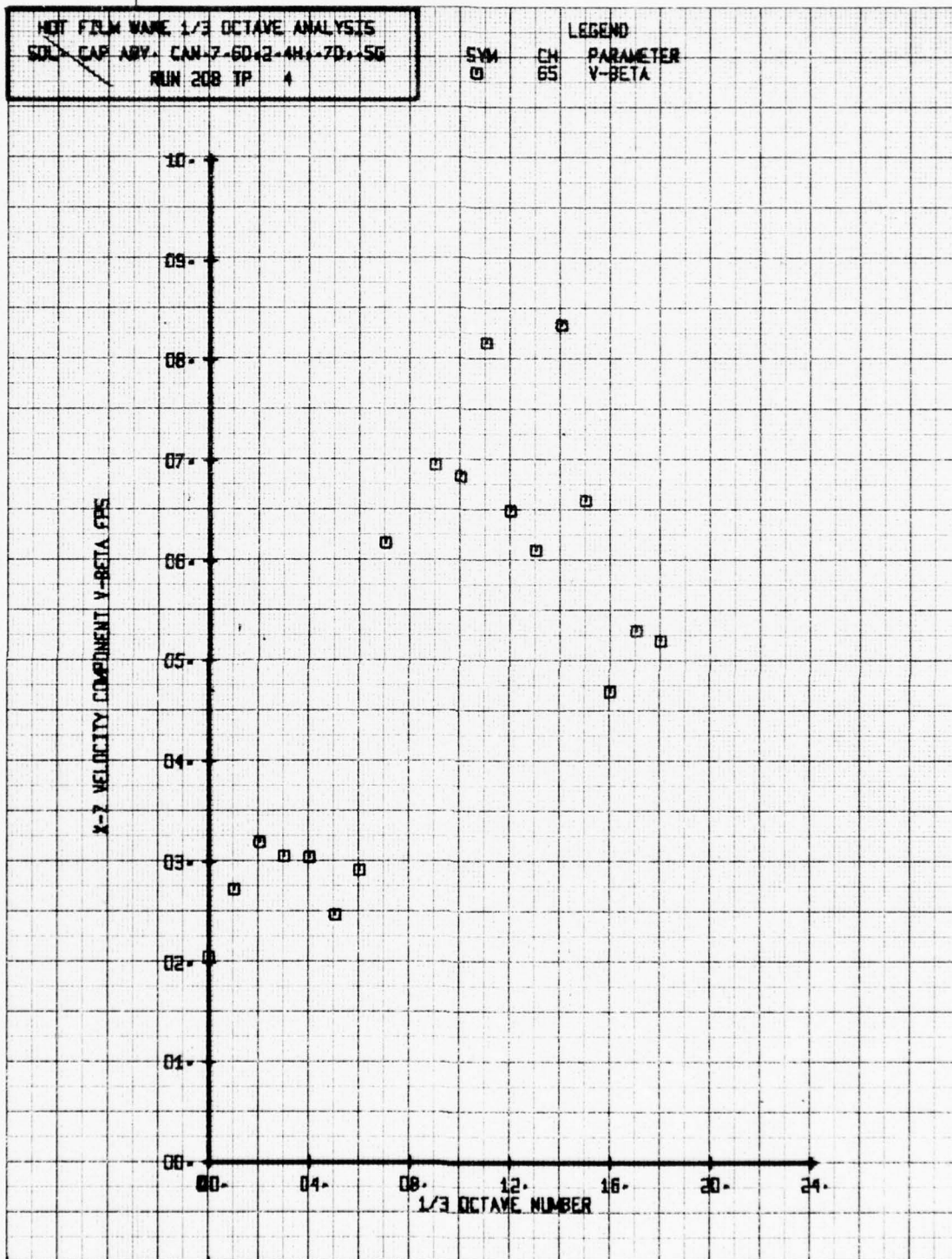




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN. 7-60-2-4H-70-56
 RUN 200 TP 3

SYM CH
 □ 65
 LEGEND
 PARAMETER
 V-BETA





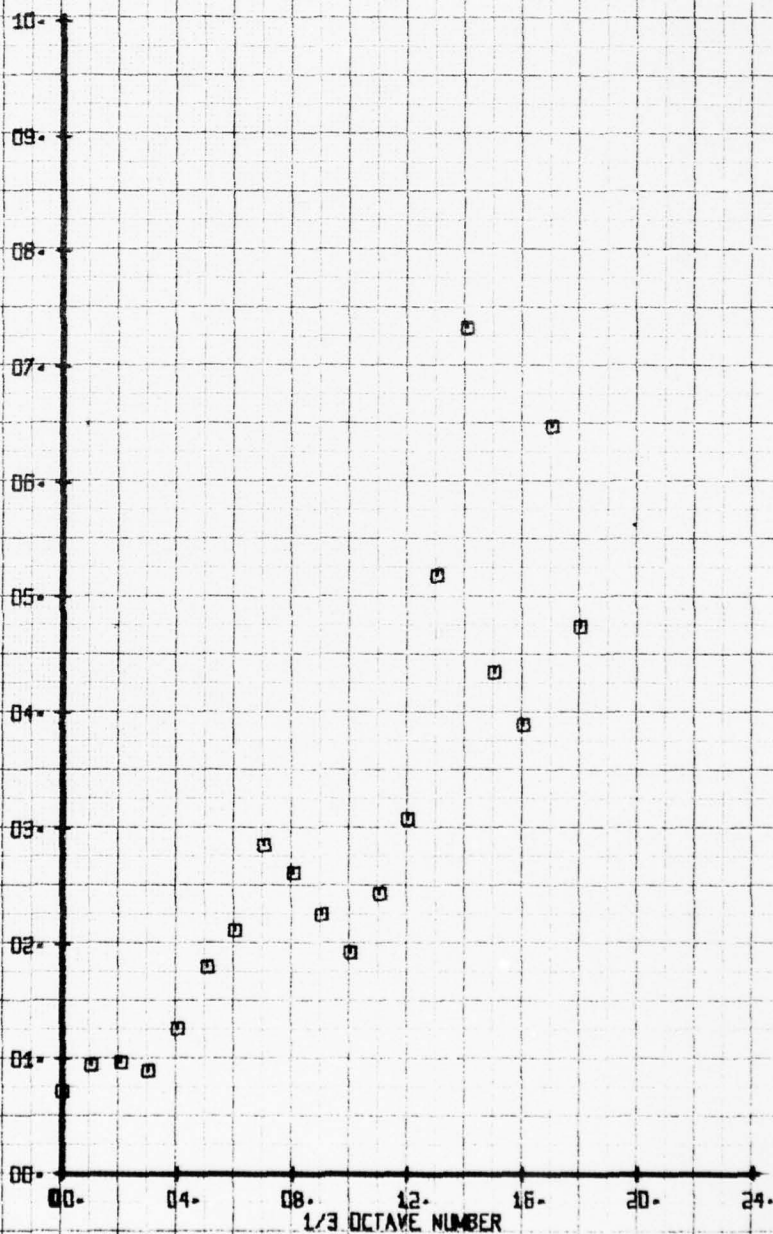
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ASY. CAN-7-60-2-4H-7D-5G
 RUN 208 TP 5

SYM
 □

CH
 65

LEGEND
 PARAMETER
 V-BETA

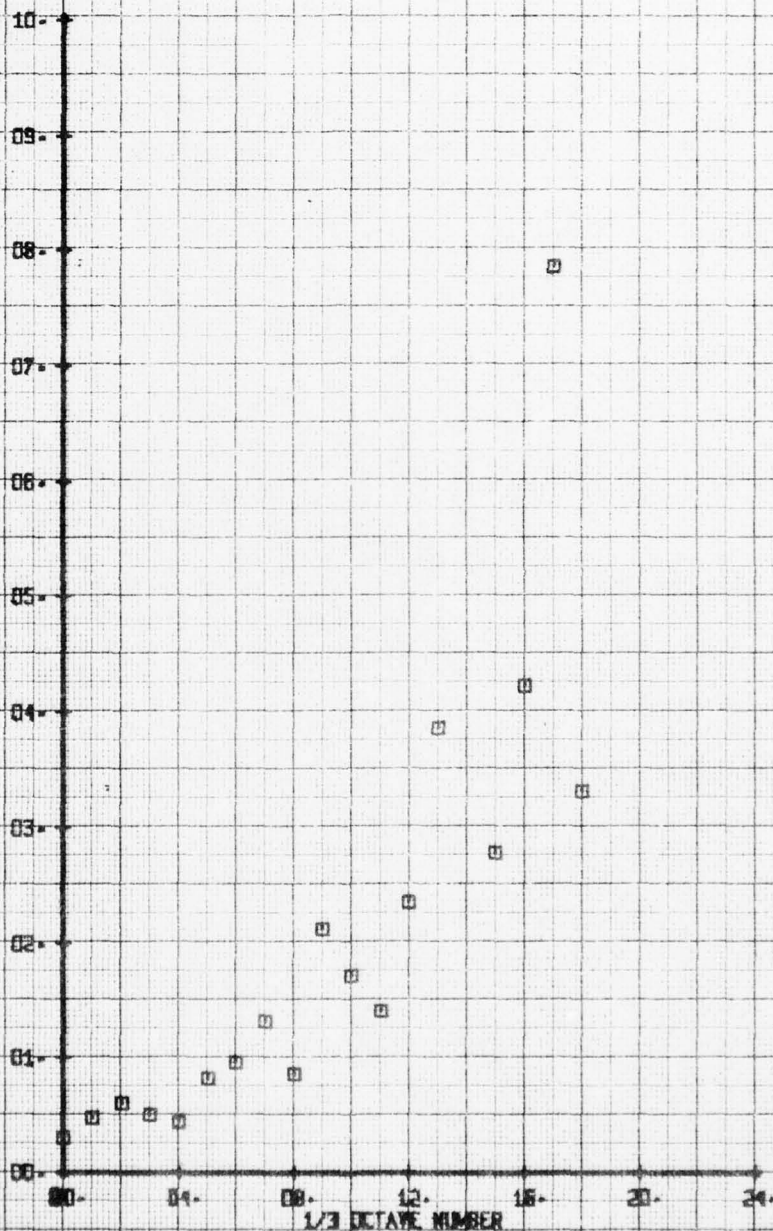
1/2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ARV CAN-7-6D-2-4H-7D-5G
 RUN 208 TP 6

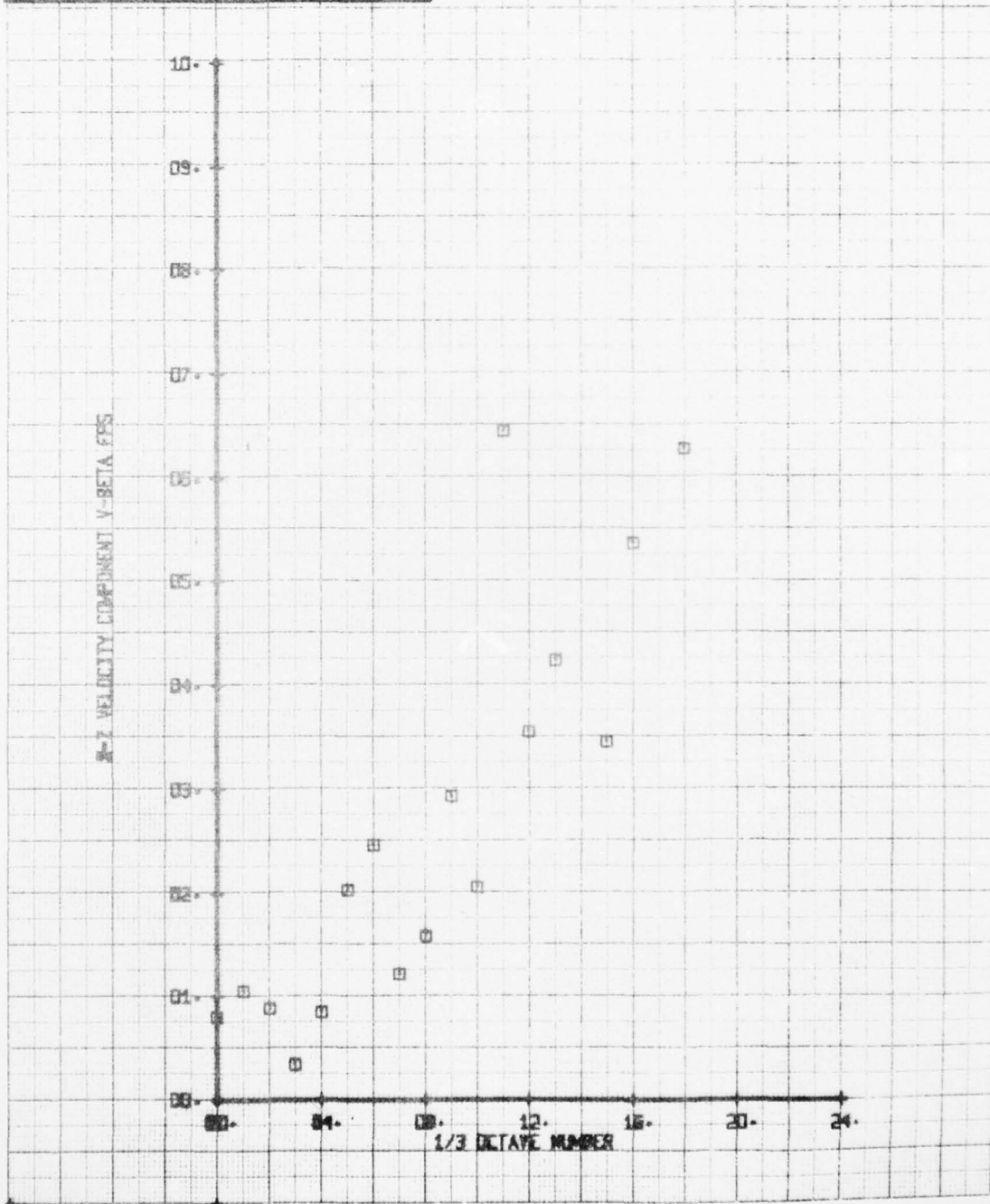
SYN CH PARAMETER
 0 65 V-BETA

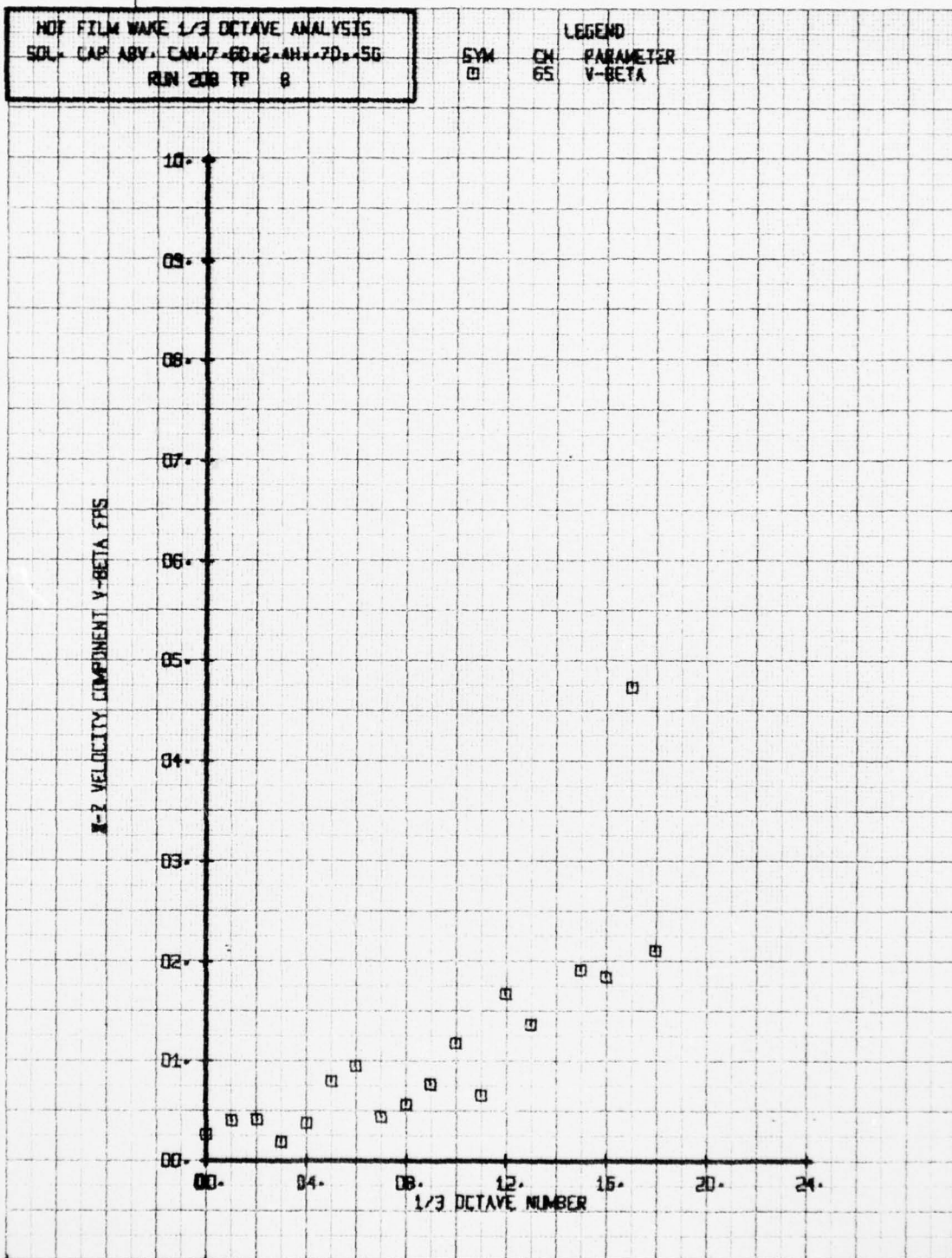
X-2 VELOCITY COMPONENT V-BETA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL- CAP ABY- CAN-7-60-2-4H-20-5G
 RUN 208 TP 7

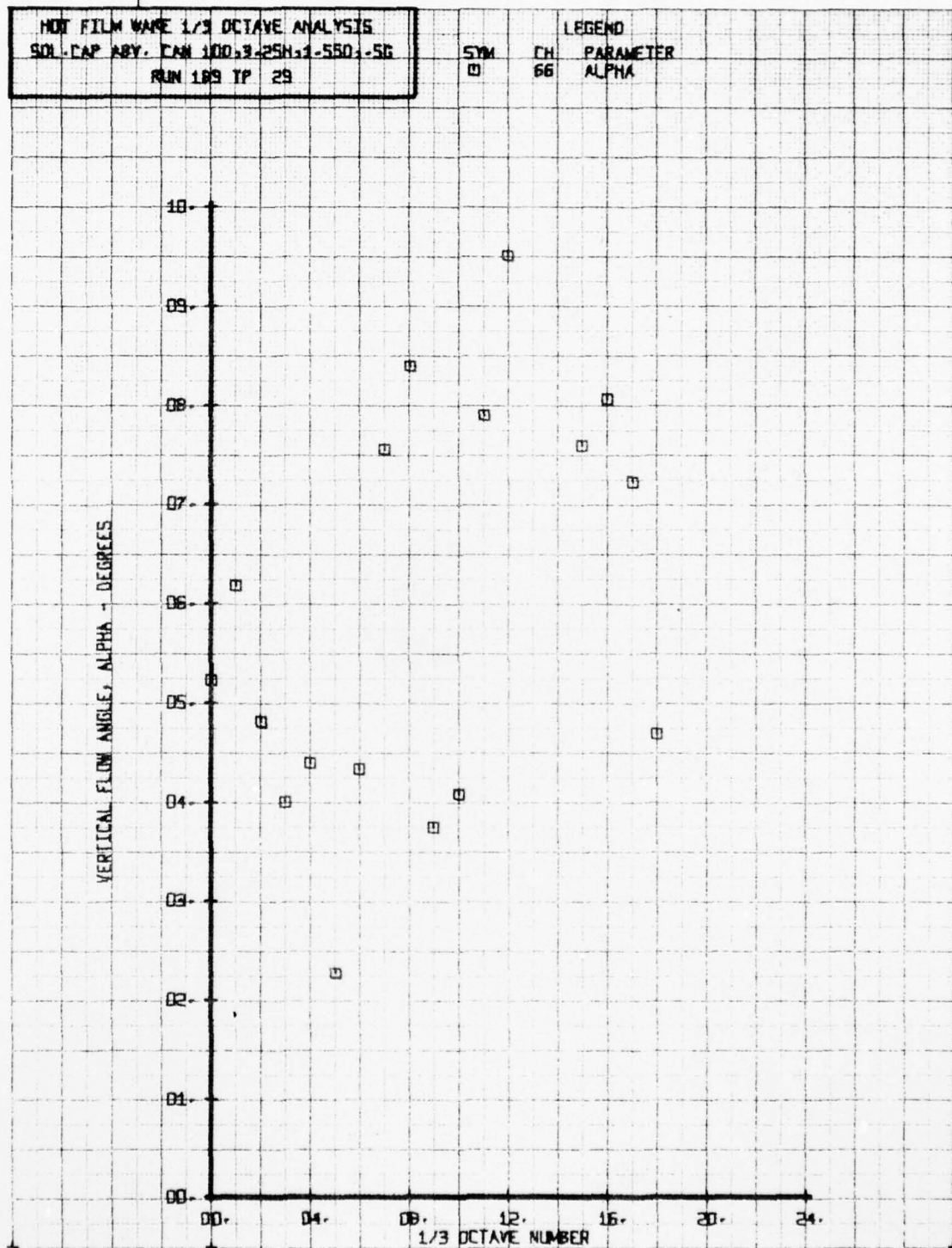
SYM CH PARAMETER
 □ 65 V-BETA





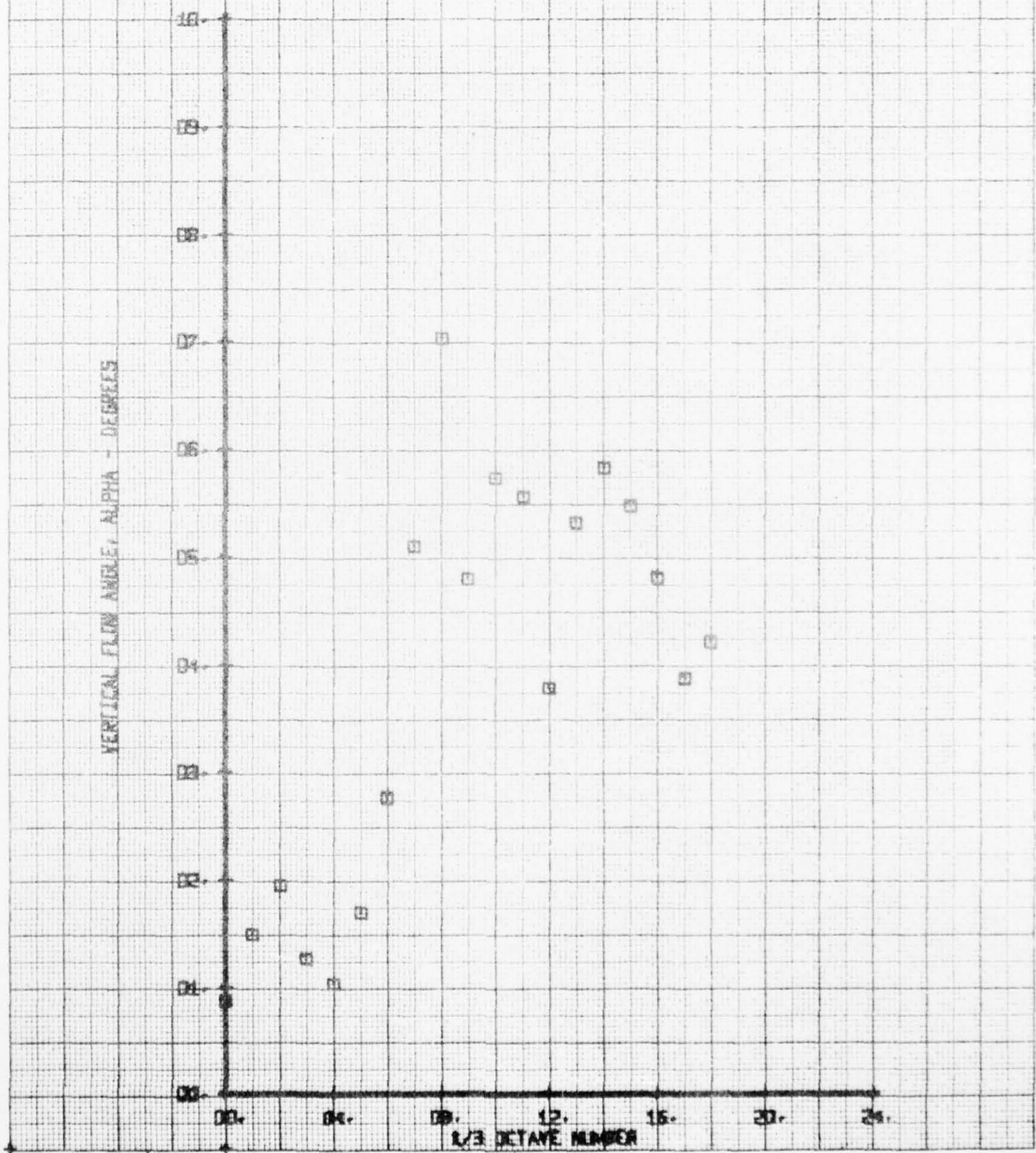
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY. CAN 100,3-25H,1-550,-5G
 RUN 189 TP 29

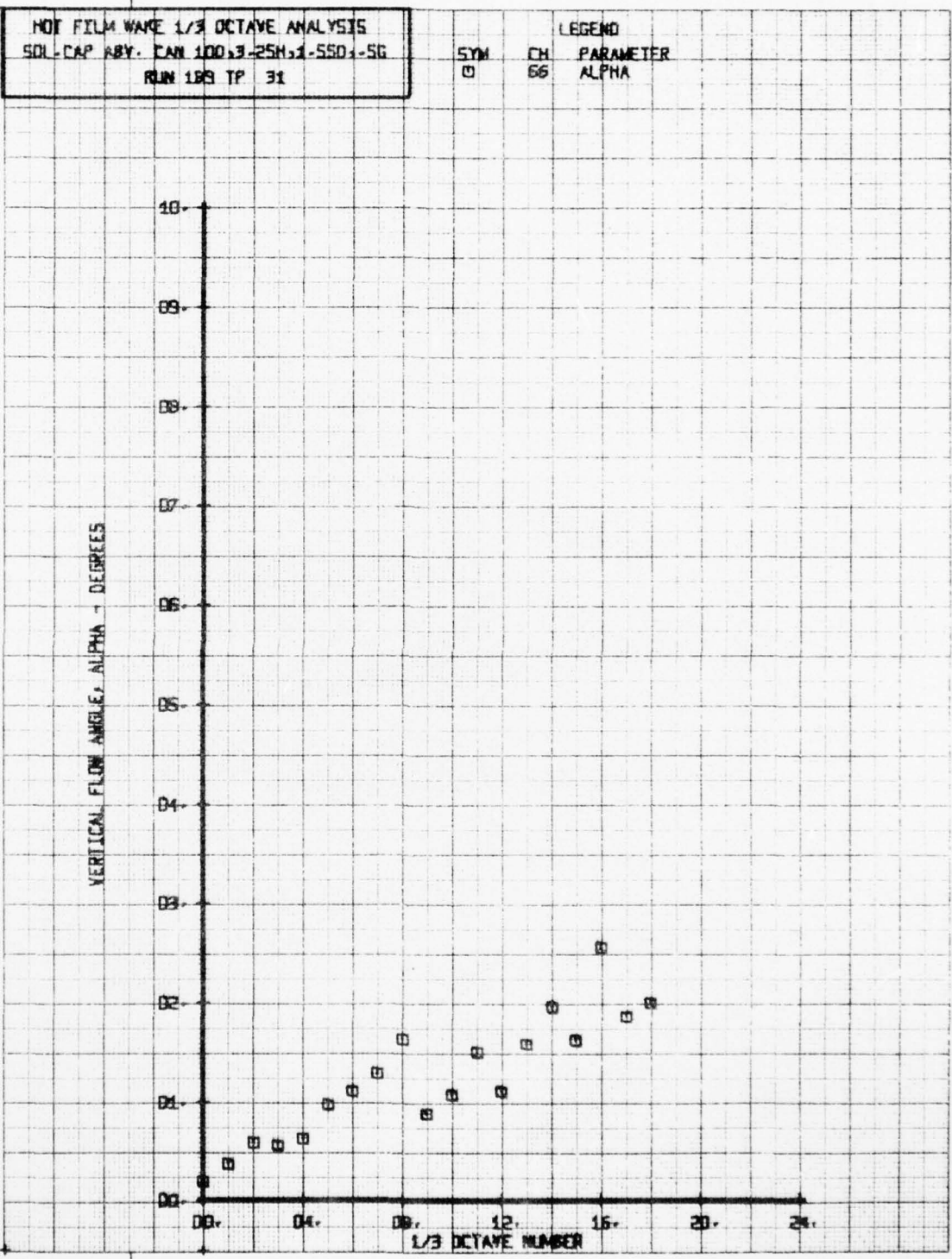
SYM CH PARAMETER
 □ 66 ALPHA



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARY. CAN 100,3-25H,1-550,-5G
 RUN 199 TP 30

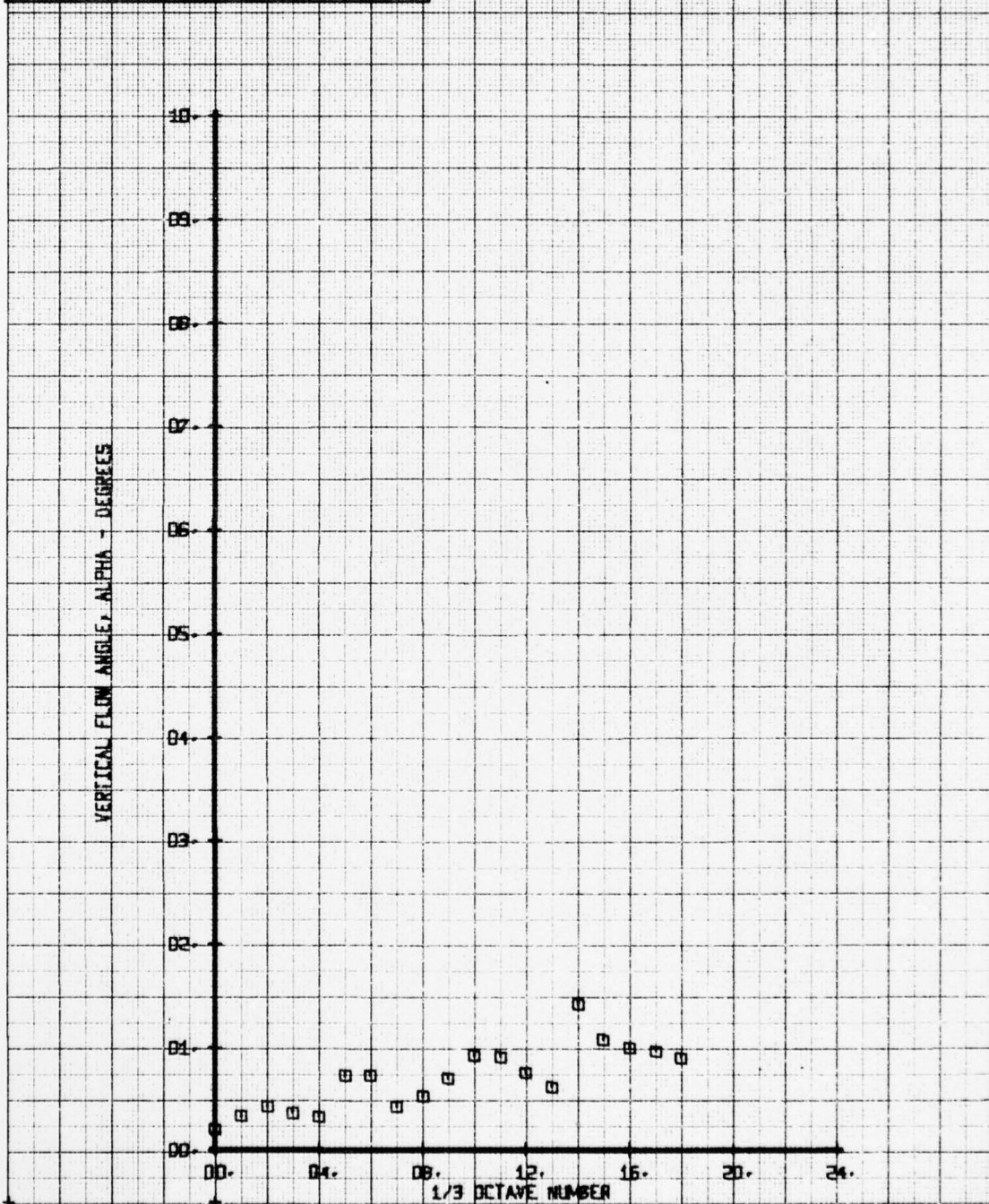
SYM CH PARAMETER
 □ 66 ALPHA





HOT FILM WIRE 1/3 OCTAVE ANALYSIS
 SOL CAP ARY. CAN 100.3-25H.1-550--5G
 RUN 189 TP 32

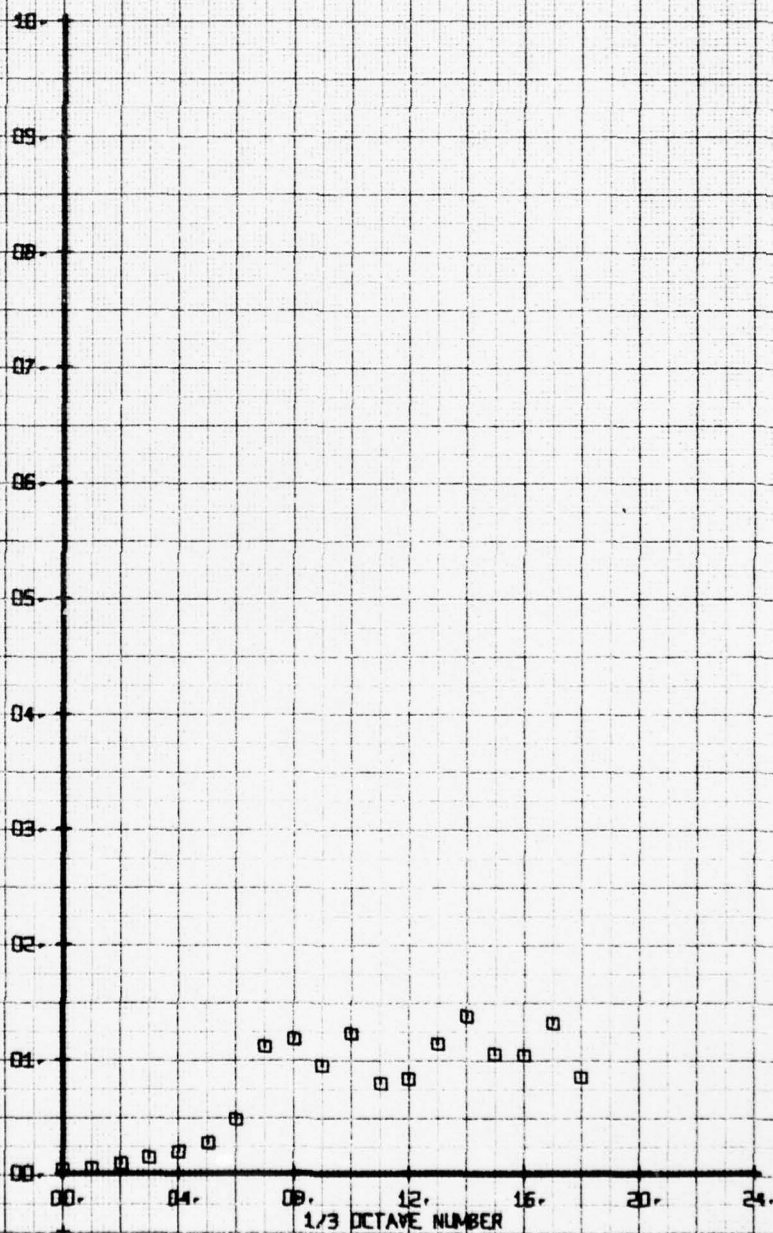
LEGEND		
SYM	CH	PARAMETER
□	66	ALPHA



NOT FILM NAME 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.3-25H.1-550.-5G
 RUN 185 TP 33

LEGEND
 SYM CH PARAMETER
 □ 66 ALPHA

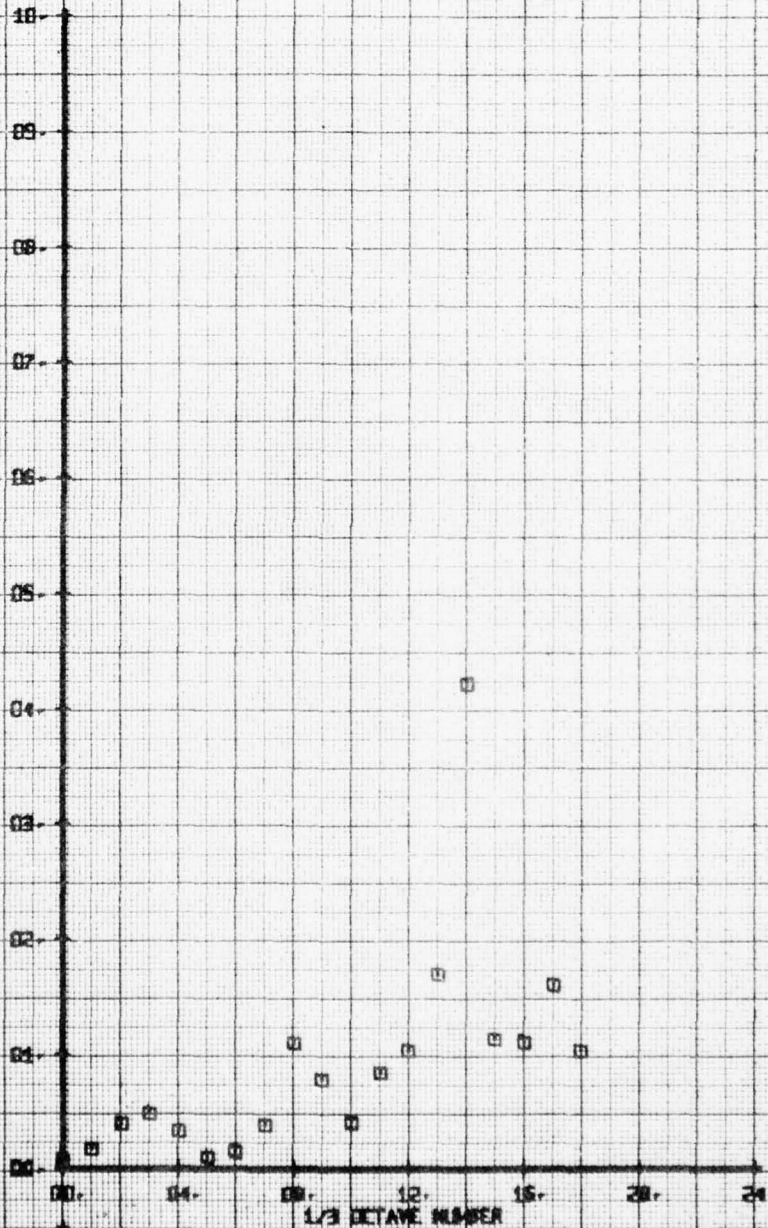
VERTICAL FLOW ANGLE, ALPHA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARY. CAN 100-3-25H-1-550-5G
 RUN 189 YP 34

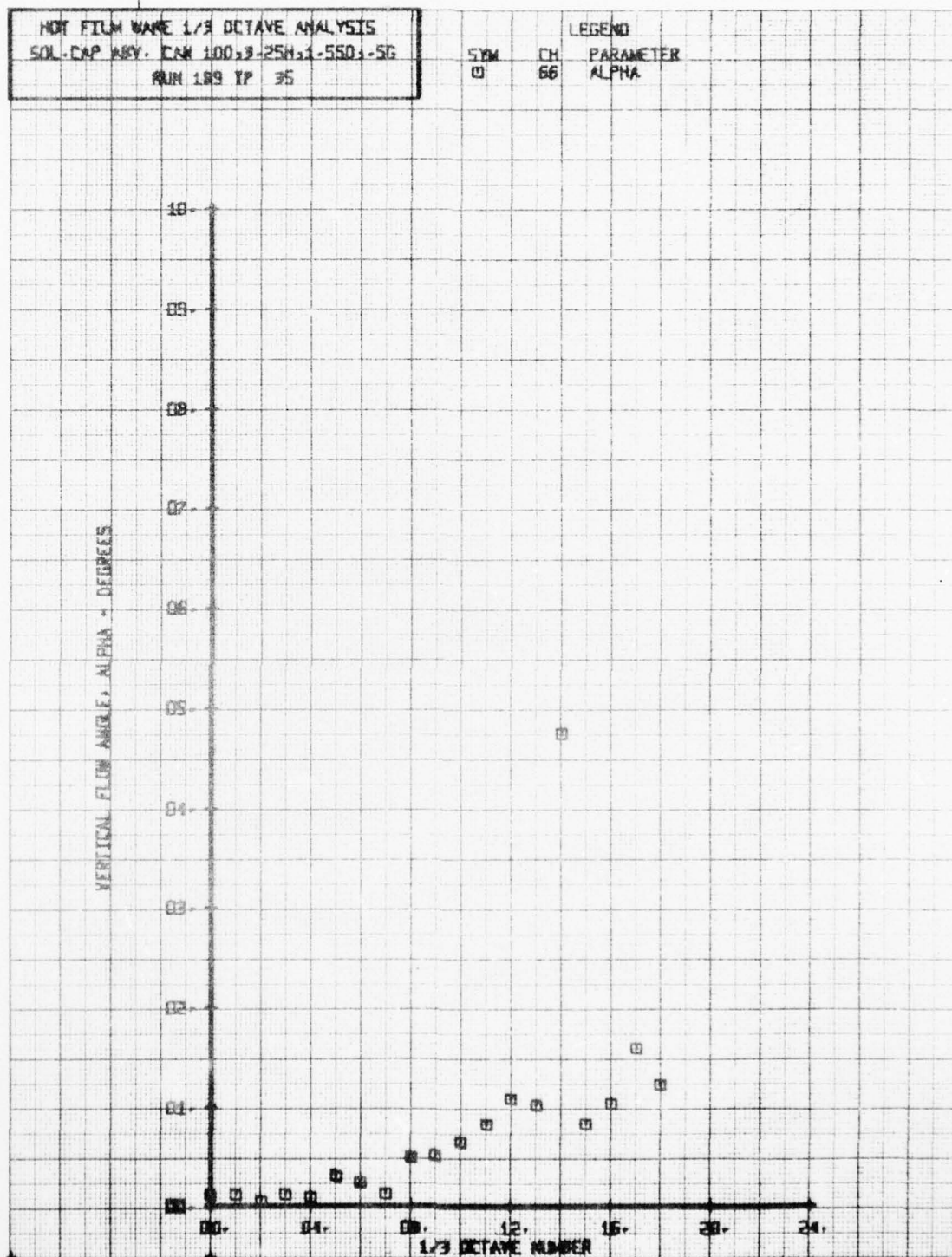
SYM	CH	PARAMETER
□	66	ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



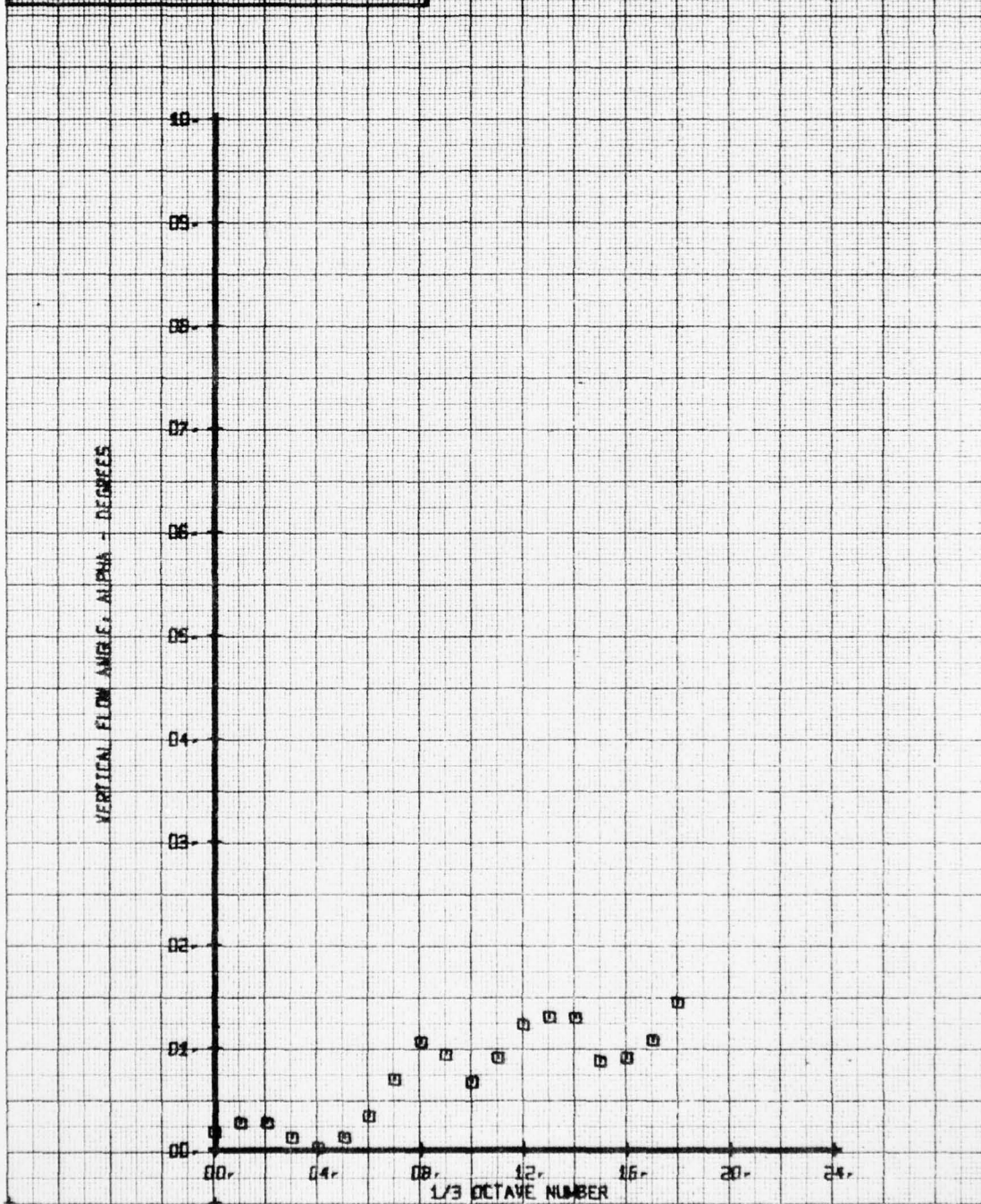
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL-CAP WBY. CAN 100.3-25H.1-5501-SG
 RUN 189 YP 35

SYM	CH	PARAMETER
□	66	ALPHA



NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100-9-250-1-500-56
 MIN 185 TP 36

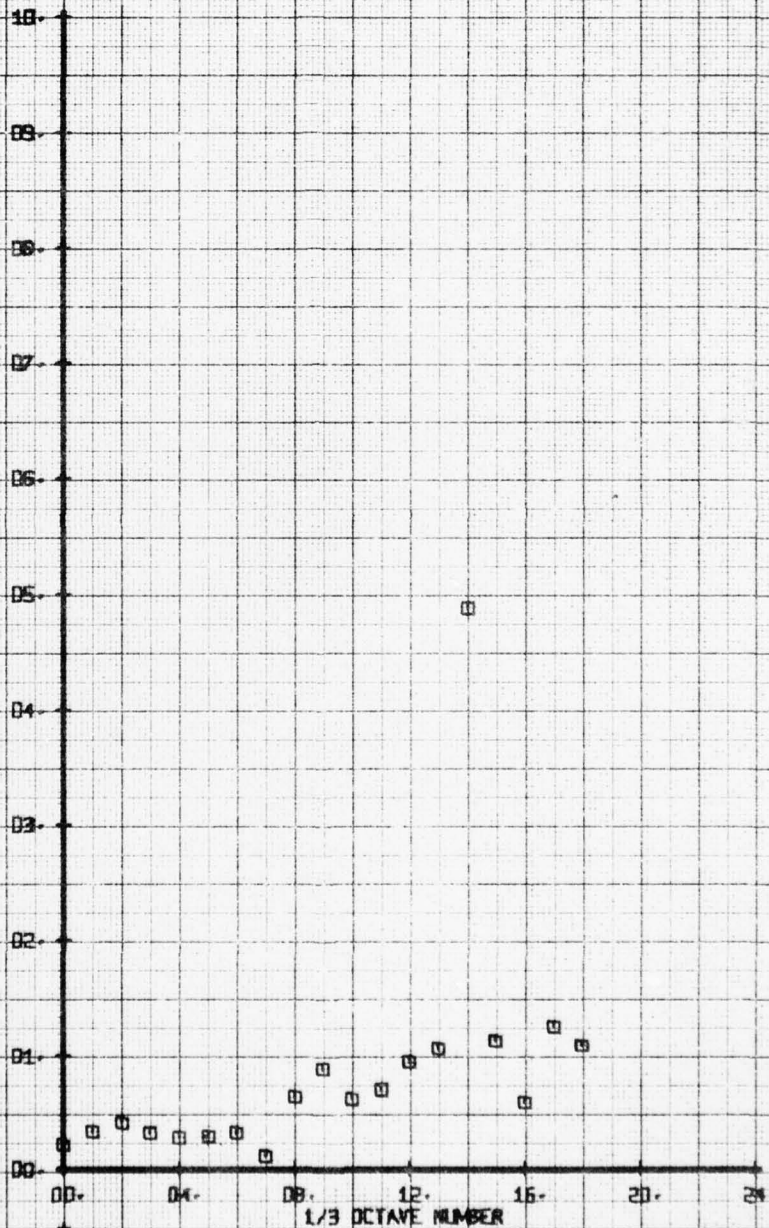
LEGEND
 CH PARAMETER
 66 ALPHA



HOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARV. CAN 100.3-25H.1-550.-56
 RUN 189 TP 37

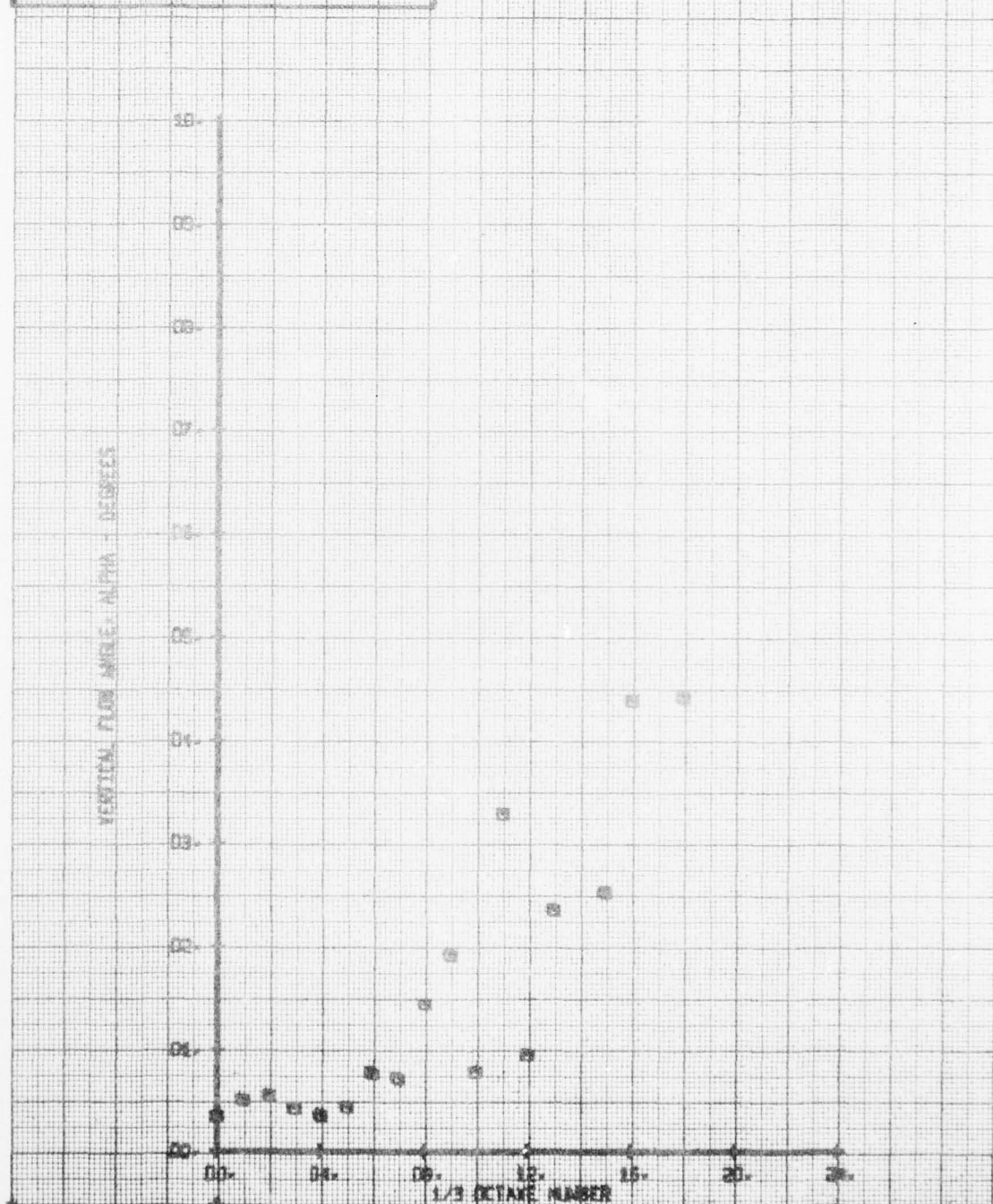
SYM	CH	PARAMETER
□	56	ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



NOT FROM WME 1/3 OCTAVE ANALYSIS
 SOL CAP ASY. CAN 100-3-25X-1-550-50
 RUN 199 TP 30

SYM	CH	PARAMETER
0	05	ALPHA

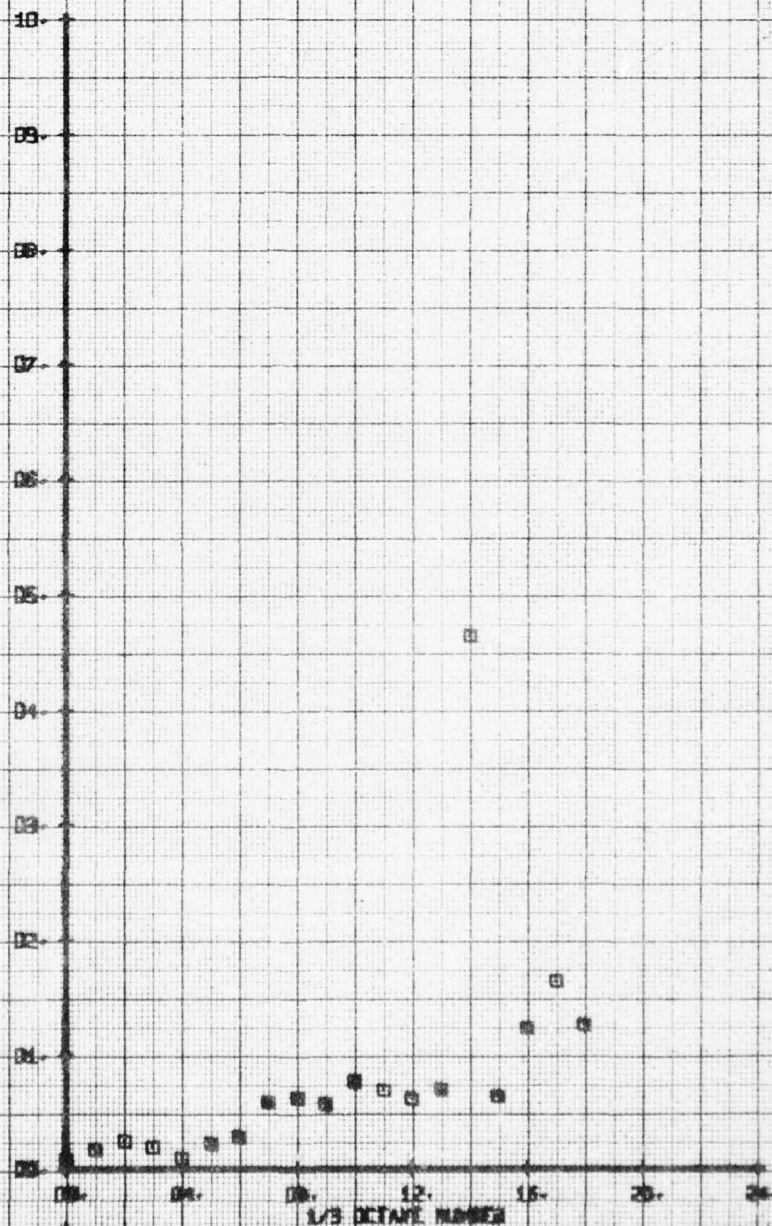


NOY FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.9-25H.1-550.-50
 RUN 109 TP 39

SYN
 0

LEGEND
 CH 66
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES



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BOEING VERTOL CO PHILADELPHIA PA
INTERACTIONAL AERODYNAMICS OF THE SINGLE ROTOR HELICOPTER CONF--ETC(U)
SEP 78 P F SHERIDAN

F/G 20/4

DAAJ02-77-C-0020

USARTL-TR-78-23D

NL

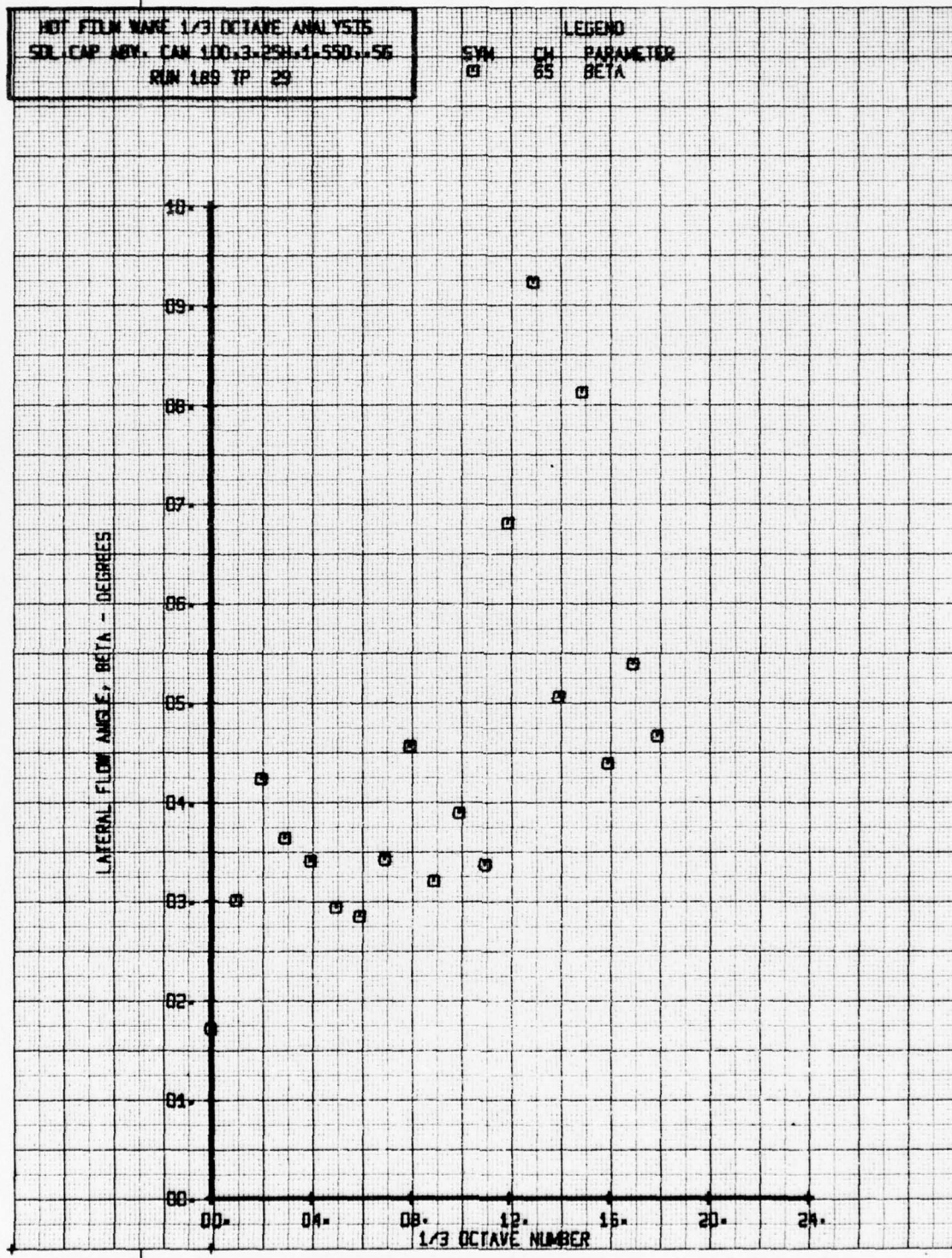
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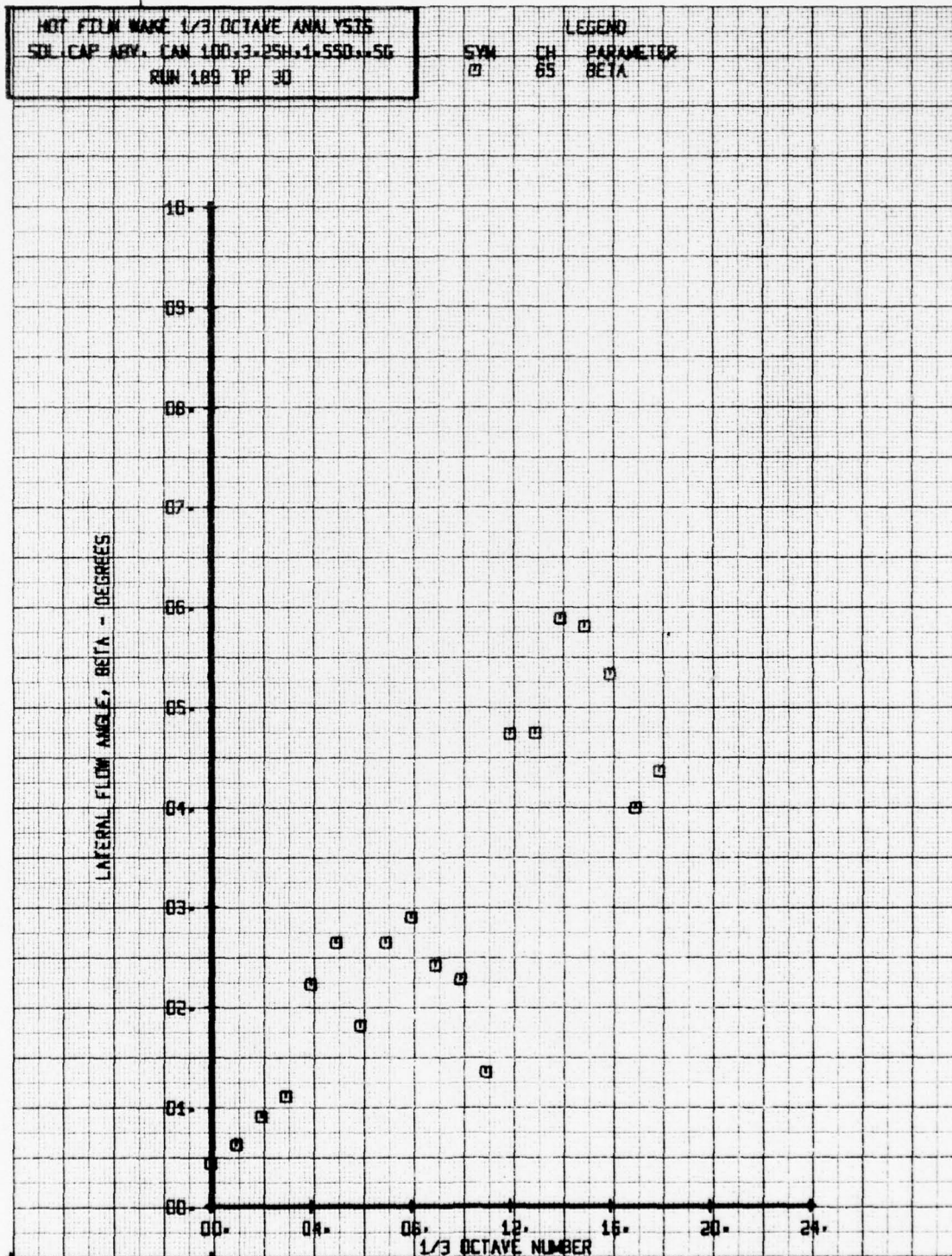
3 OF 3

AD
A063 801



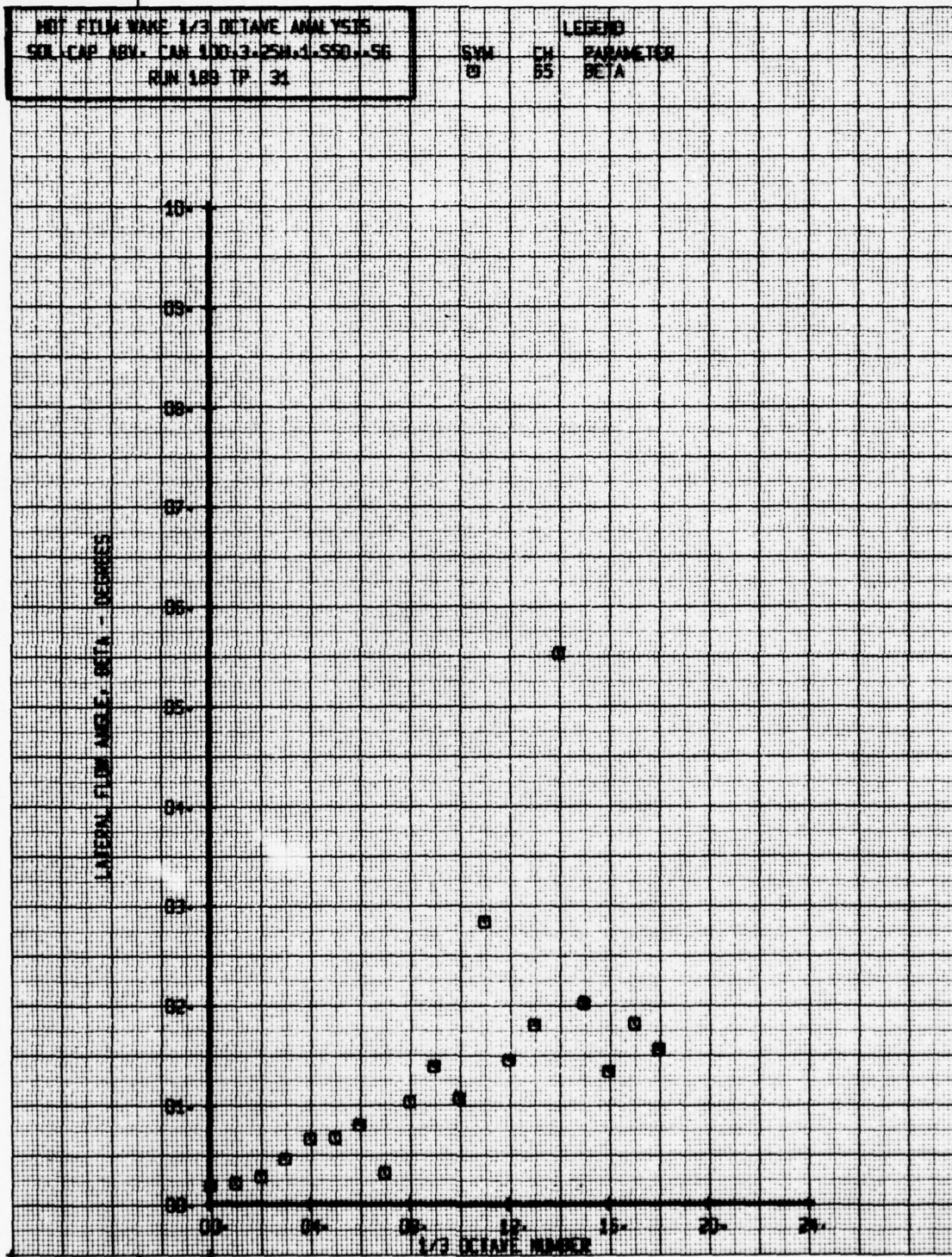
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DATE
FILMED
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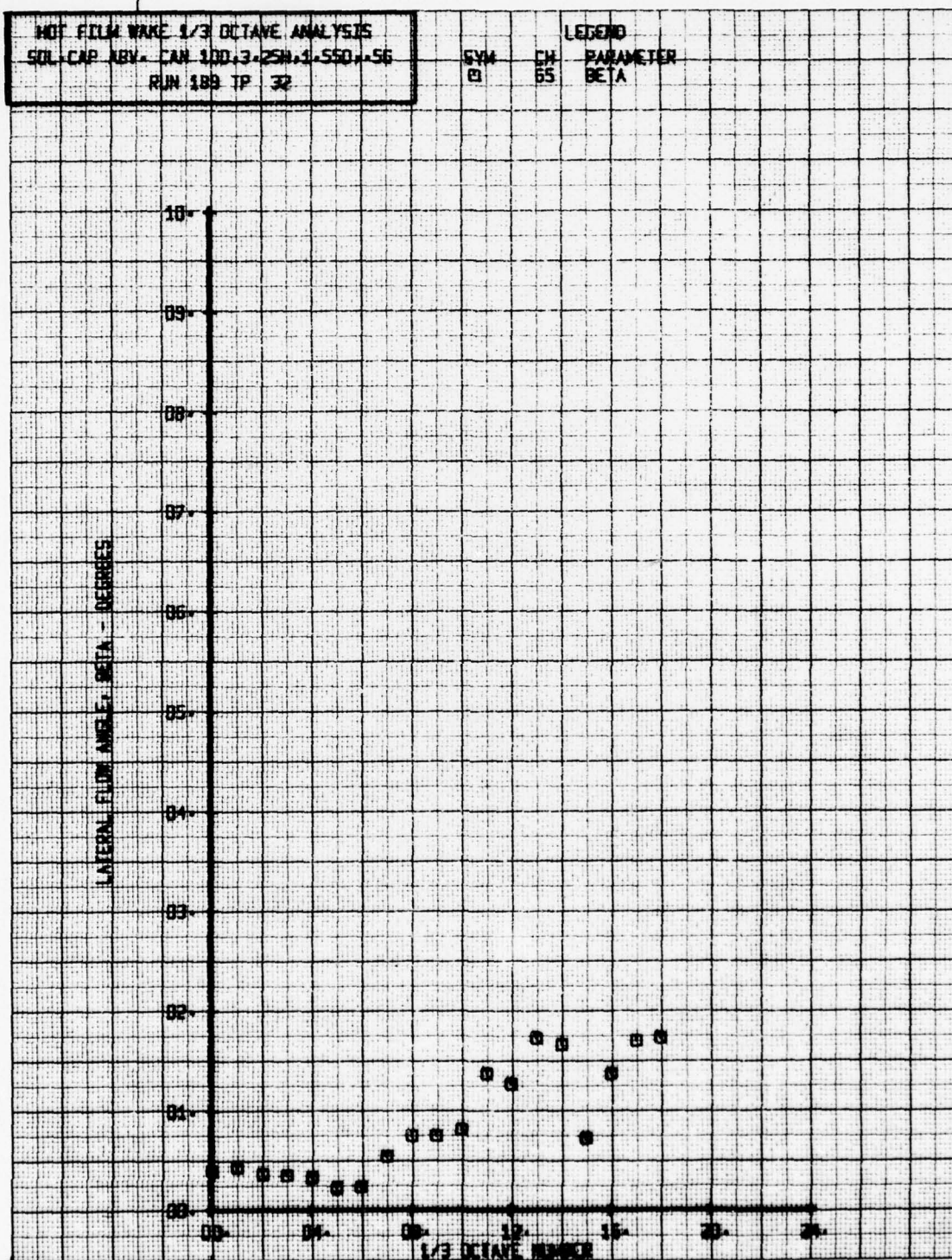
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SER. CAP. ABV. CAN 100.3.25H.1.550.56
 RUN 189 TP. 31

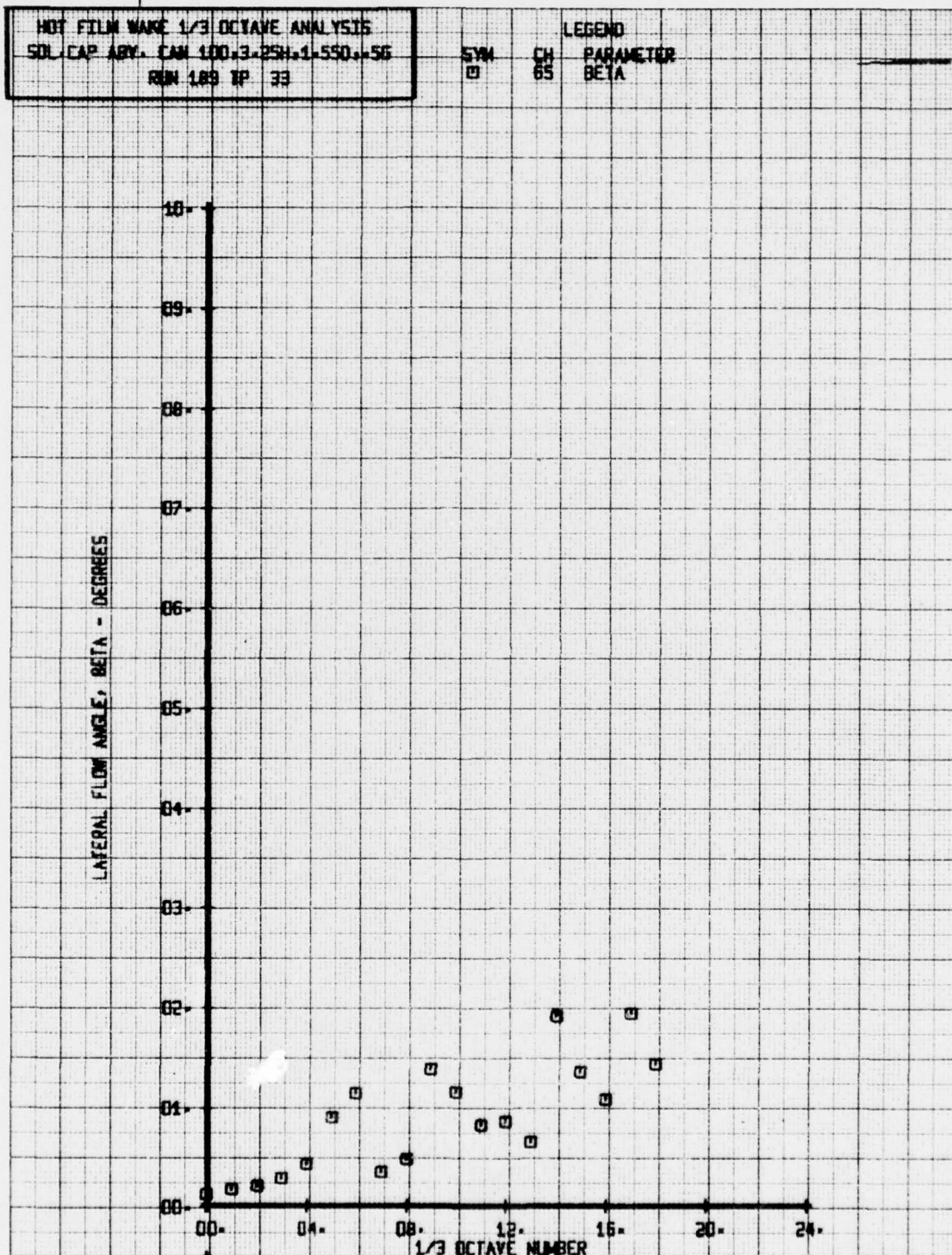
SW	CH	PARAMETER
0	55	BETA

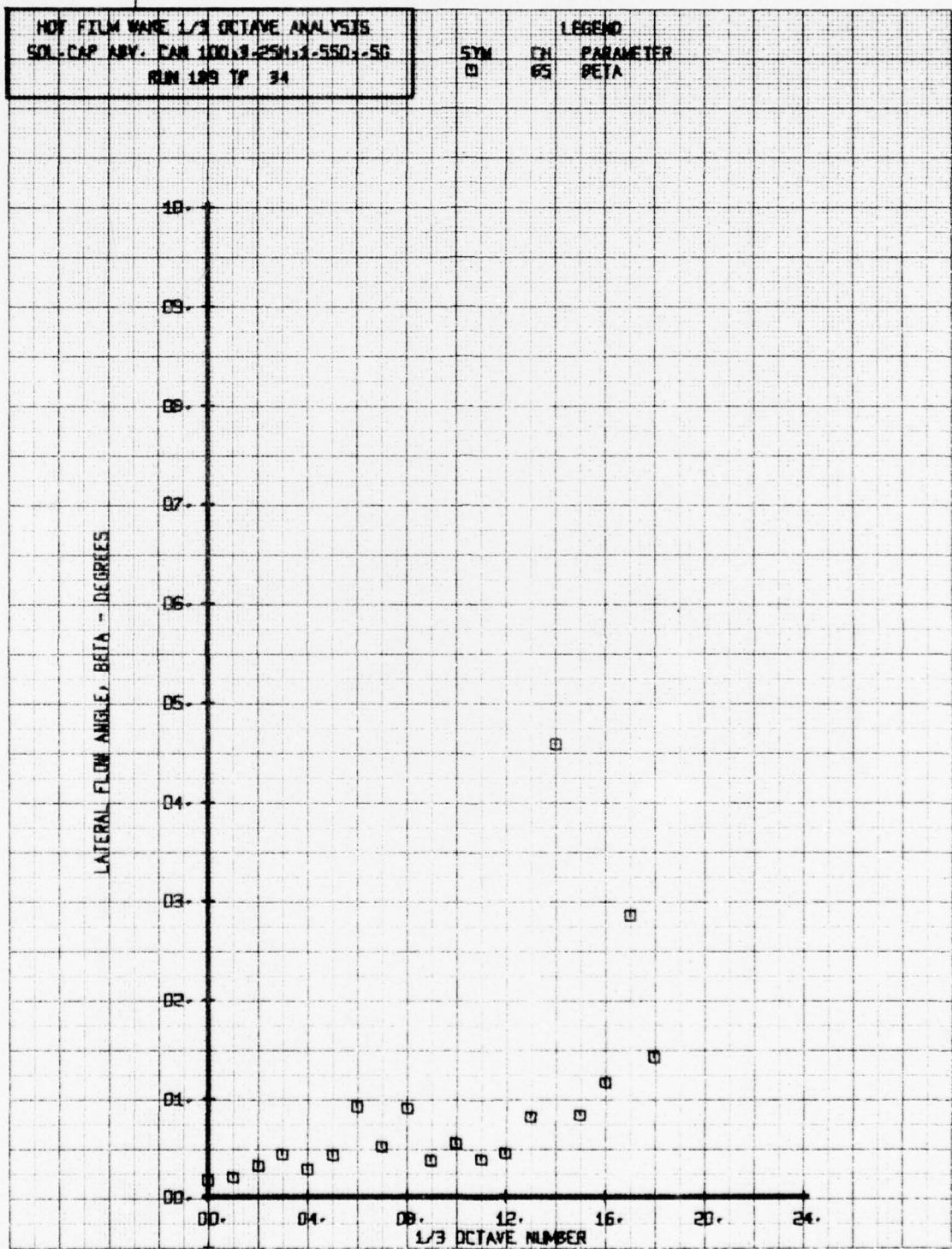


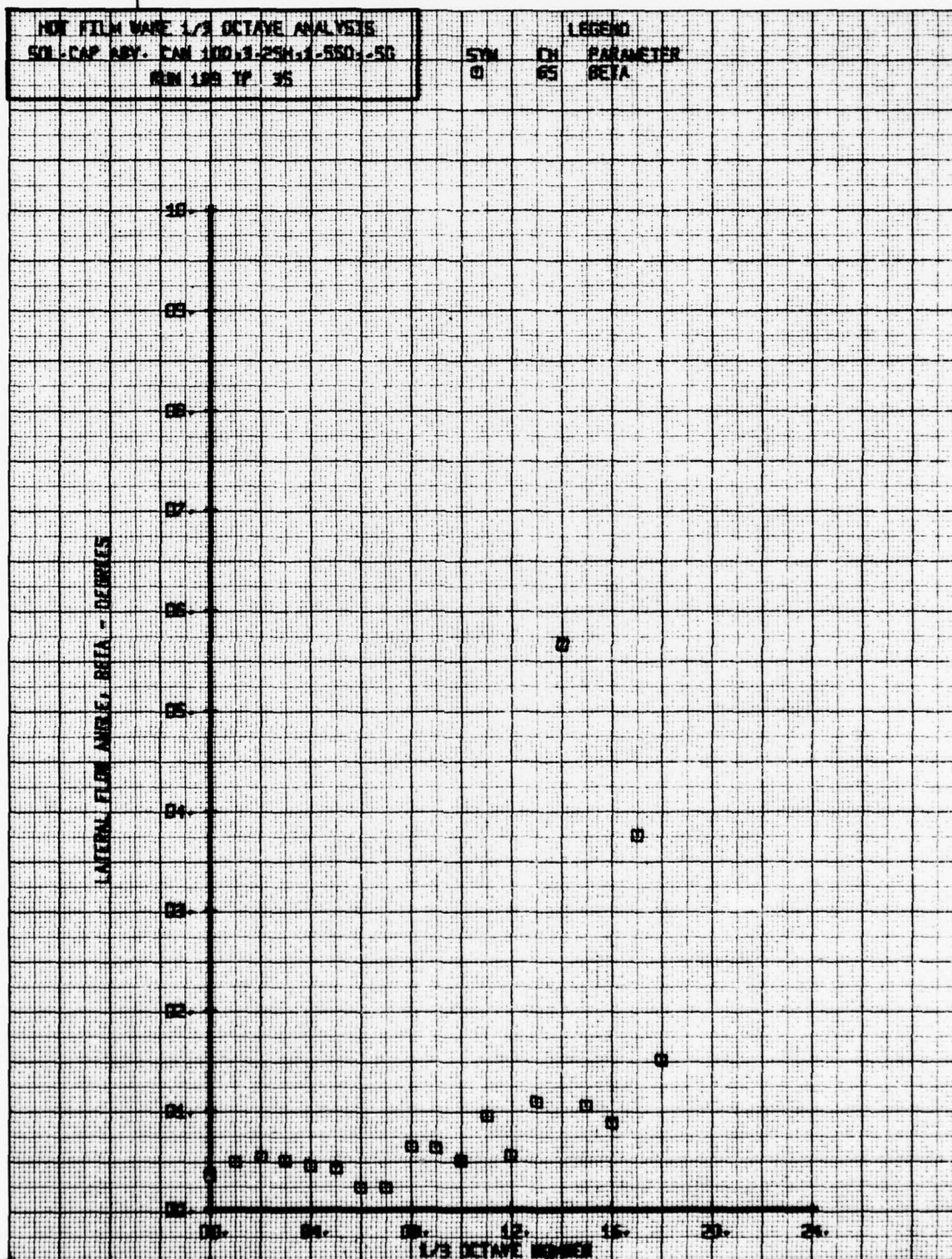
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP NBY. CAN 100.3-25N.1-550.56
 RUN 188 TP 32

LEGEND	
SYM	CH
□	65
PARAMETER	
BETA	



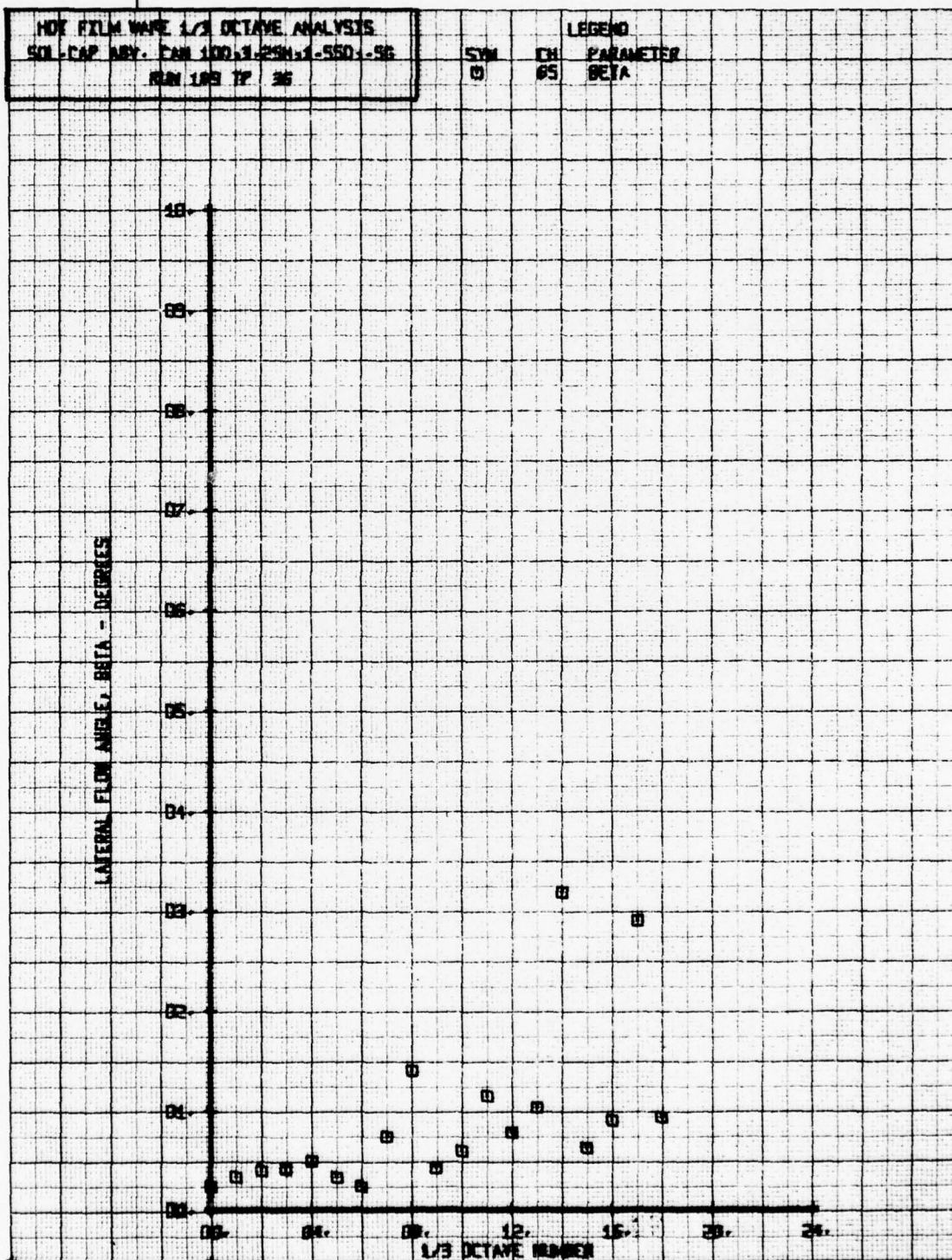


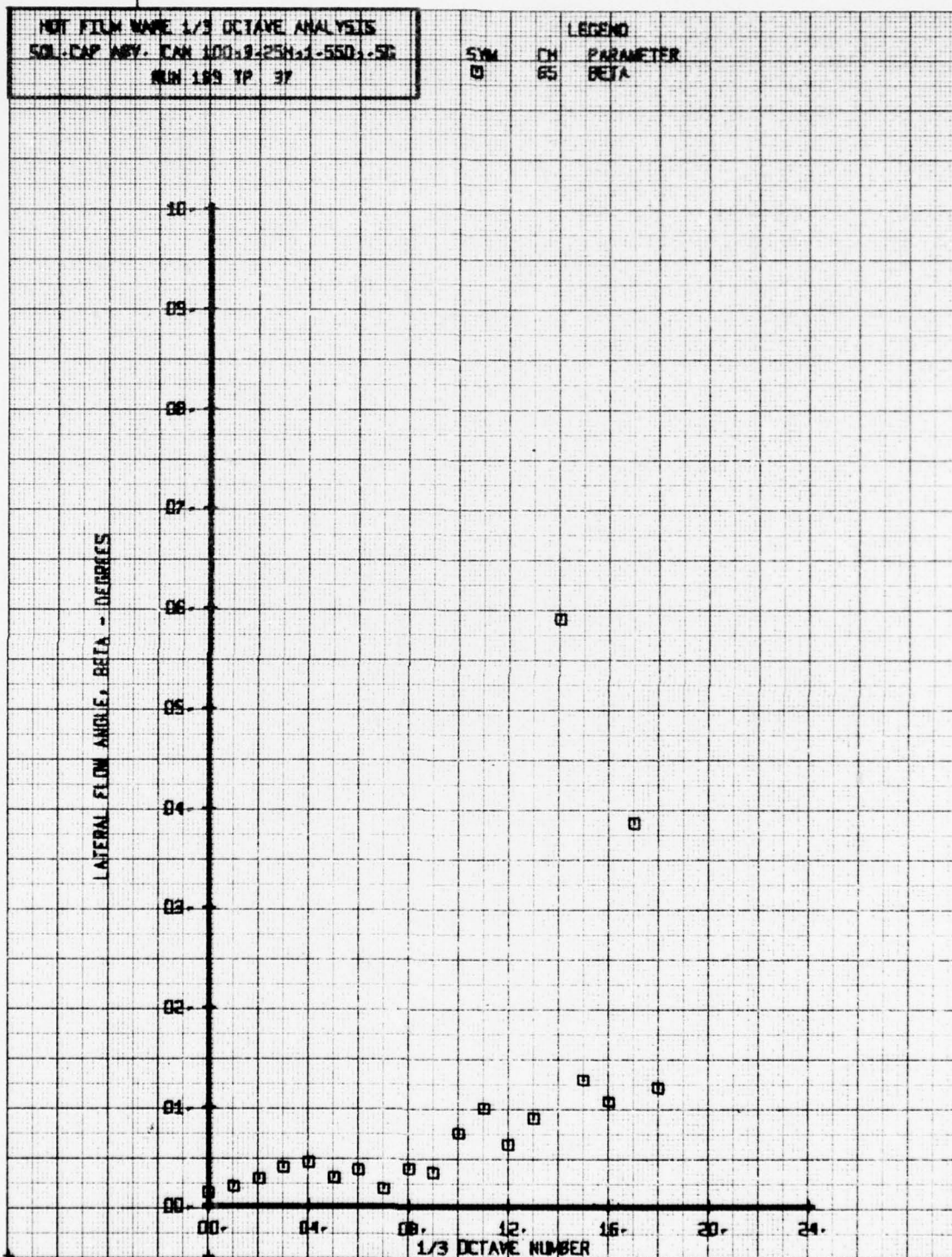




NOY FILM WARE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARY. CAN 100.1-25H.1-550.-56
 RUN 189 TP 36

SYM	CH	PARAMETER
0	65	BETA

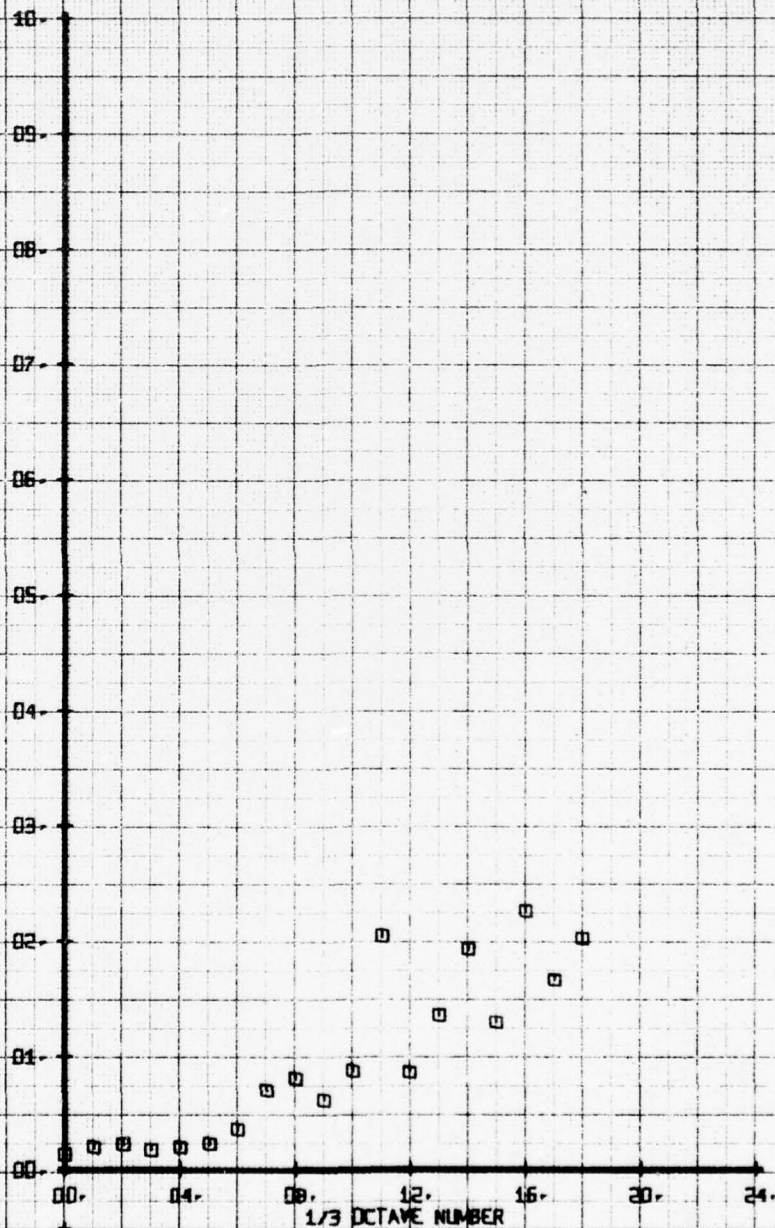


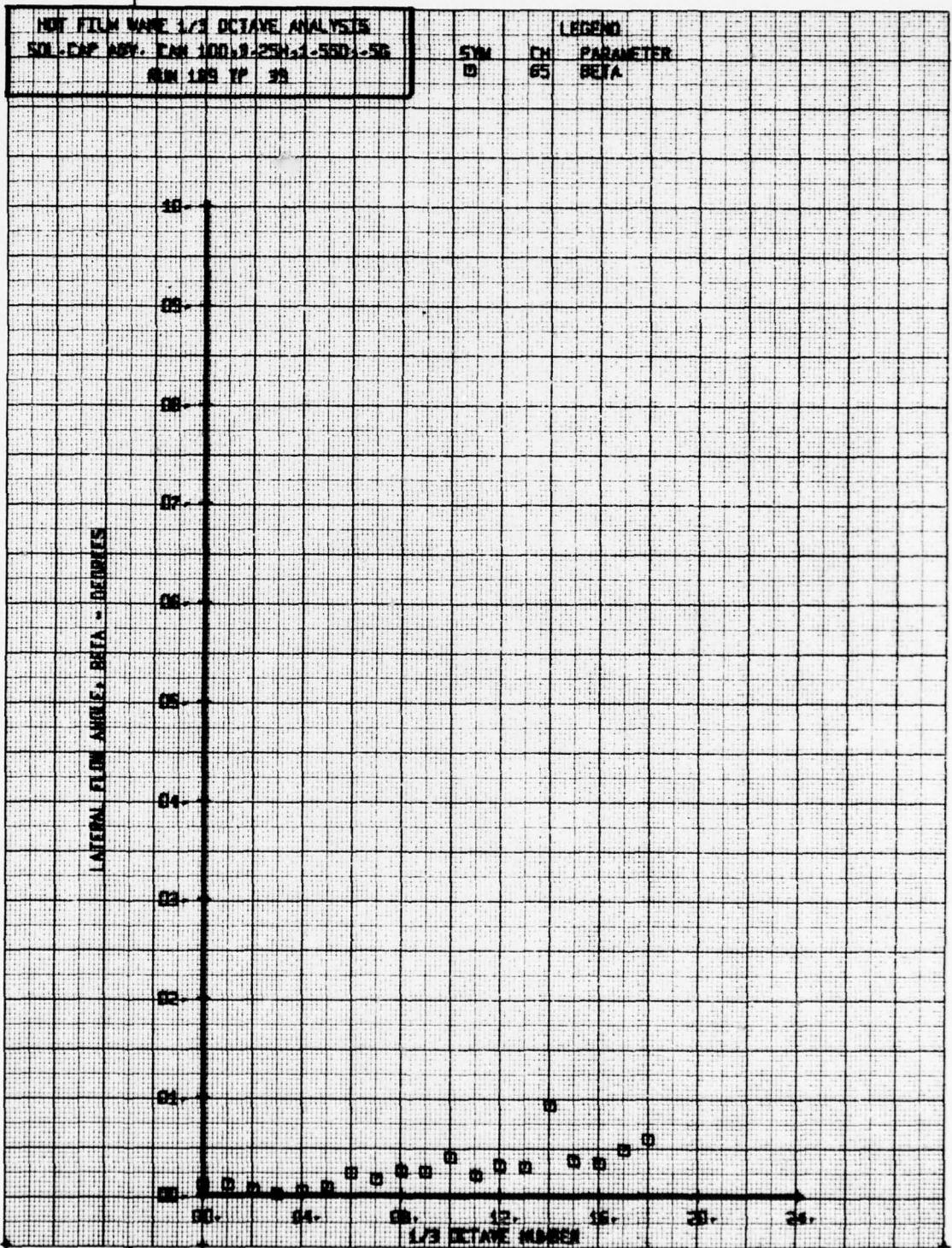


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. AMY. CAN 100, 9-25N, 1-550, -SG
 RUN 189 TP 38

SYM	CH	PARAMETER
0	65	BETA

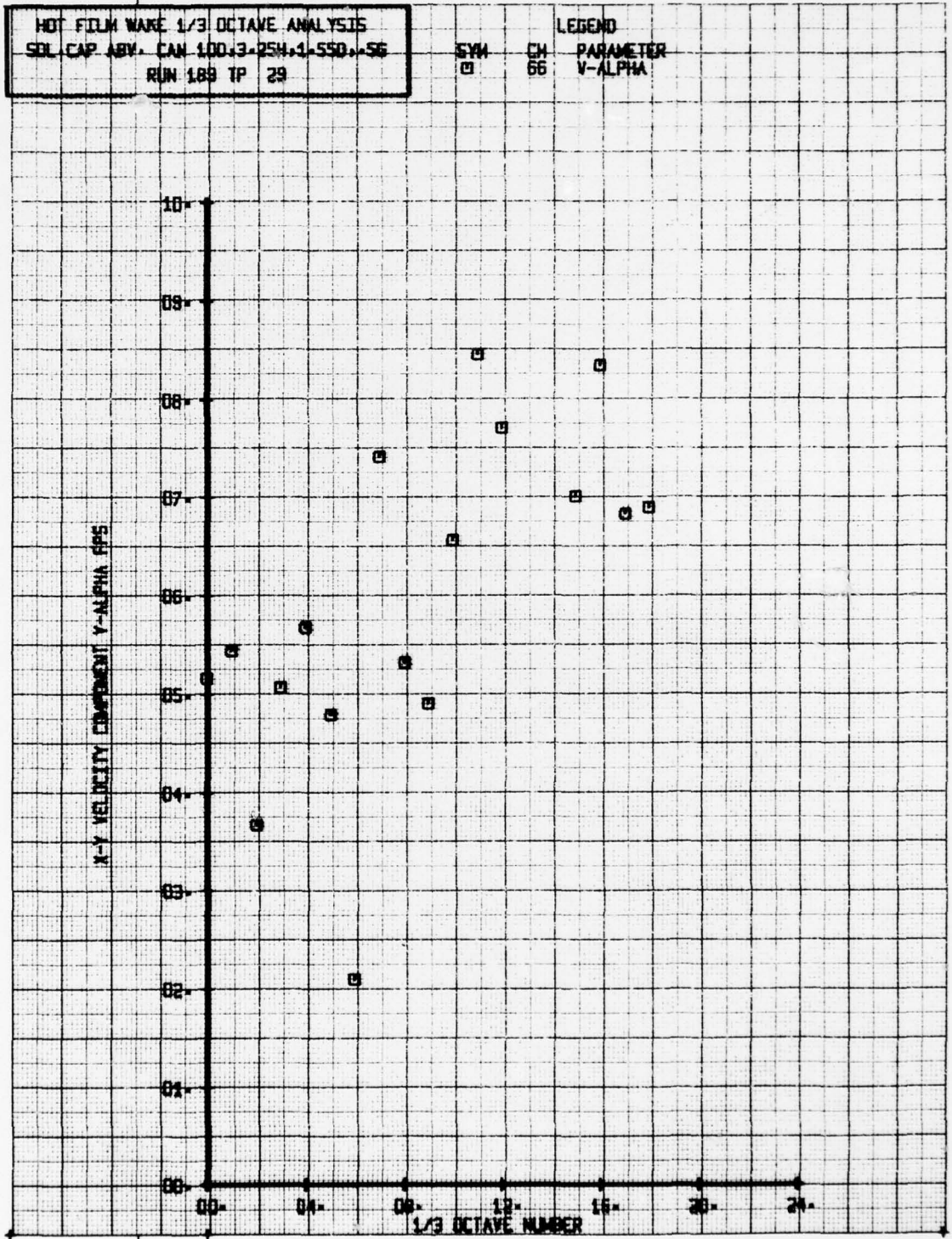
LATERAL FLOW ANGLE, BETA - DEGREES

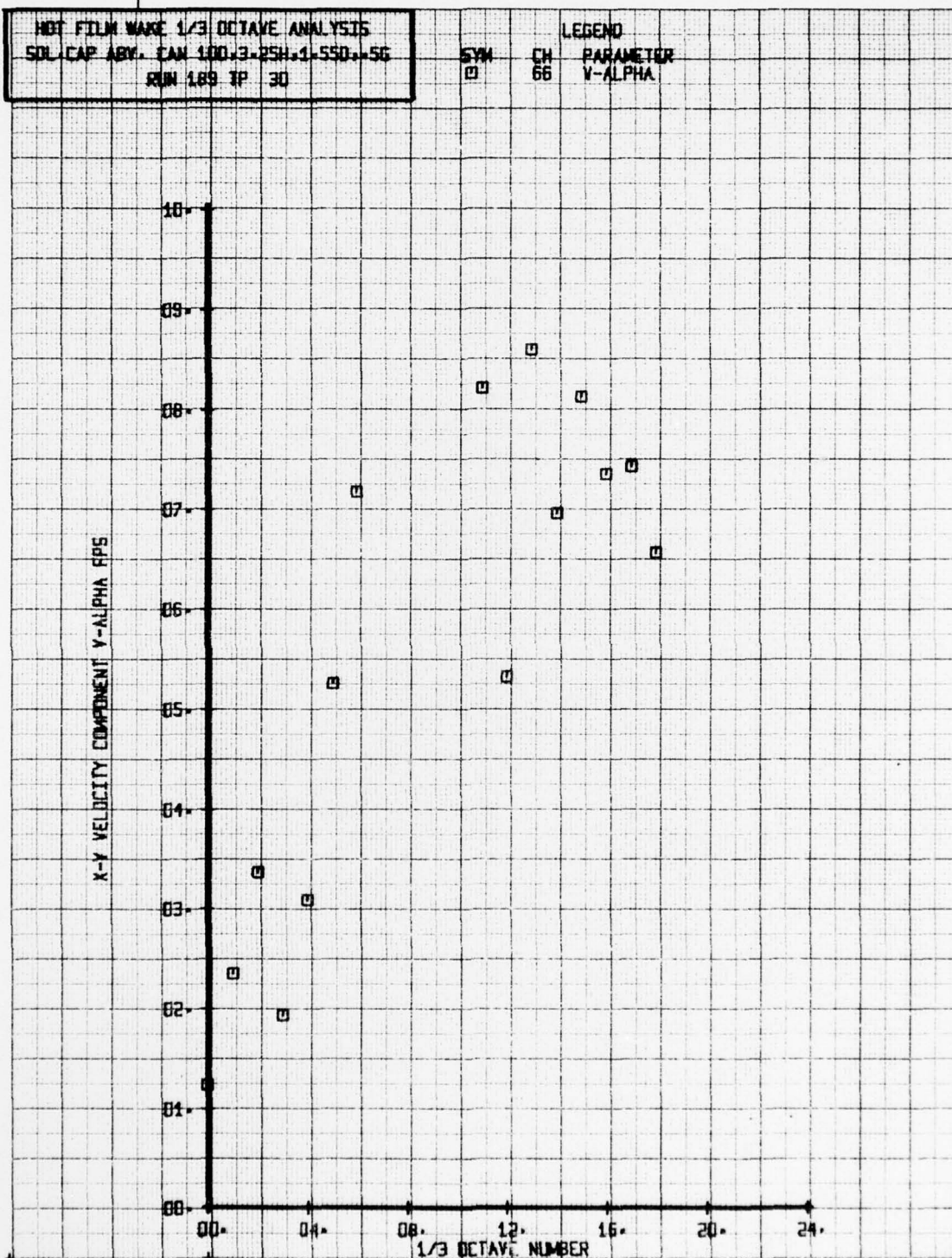




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100.3-25H.1-550.-56
 RUN 189 TP 29

SYM CH
 □ 66
 LEGEND
 PARAMETER
 V-ALPHA





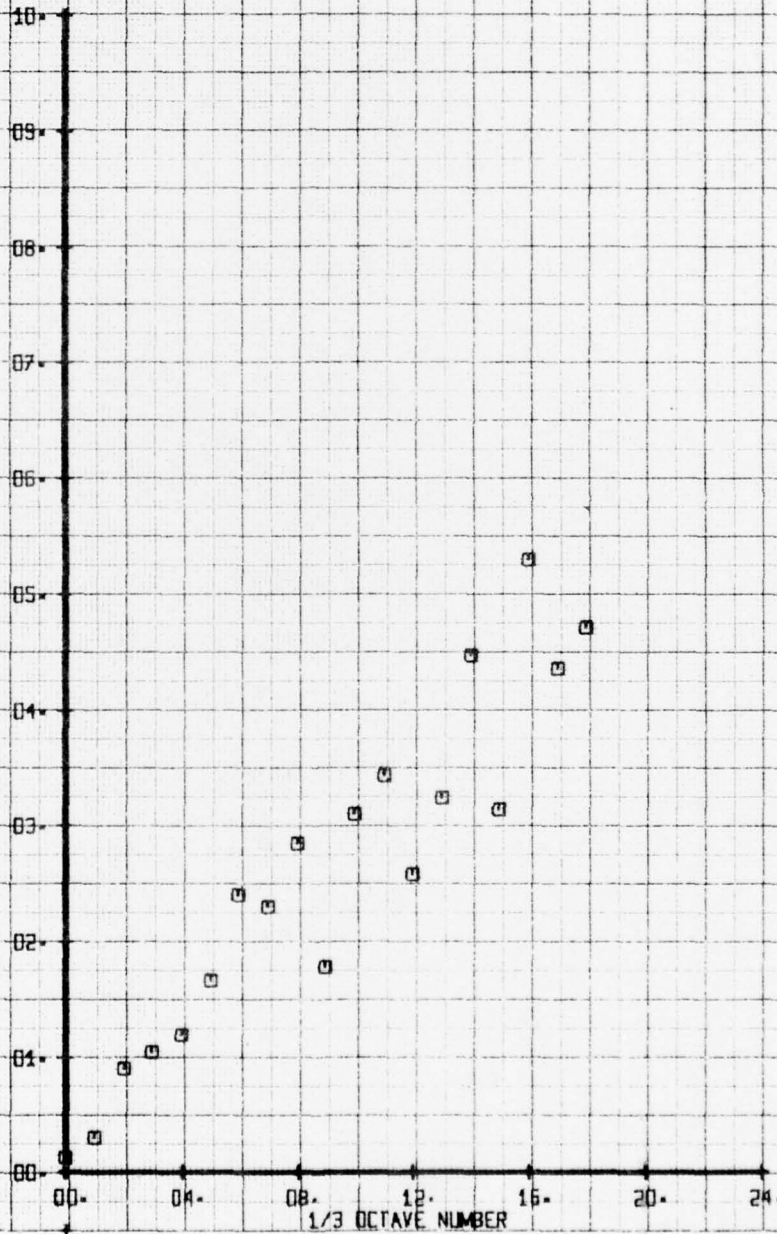
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100.3-25H-1-55D-56
 RUN 189 TP 31

SYM
 □

CH
 66

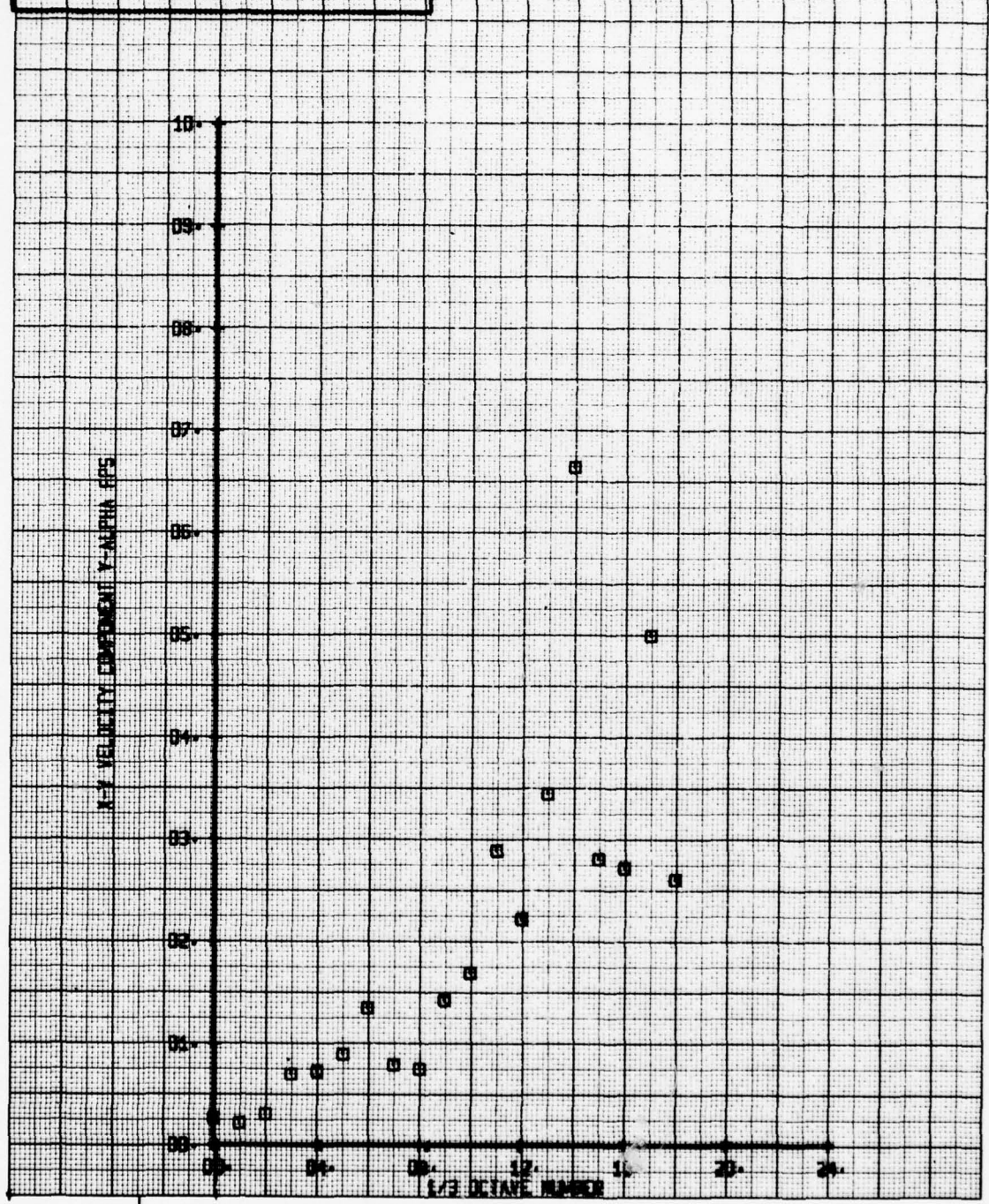
LEGEND
 PARAMETER
 V-ALPHA

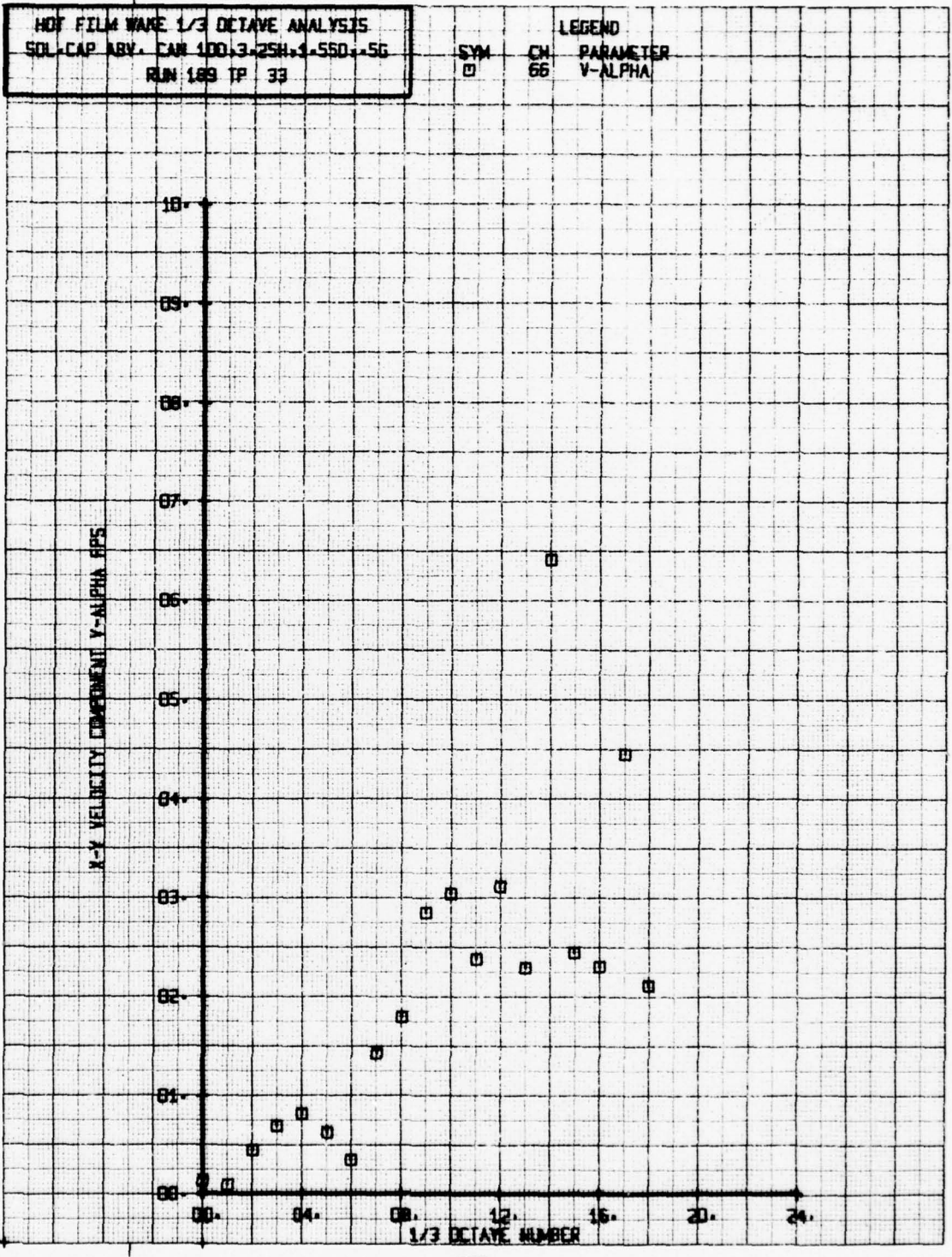
X-Y VELOCITY COMPONENT V-ALPHA FPS



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100.3-25N.1-550.-56
 RUN 185 TP 32

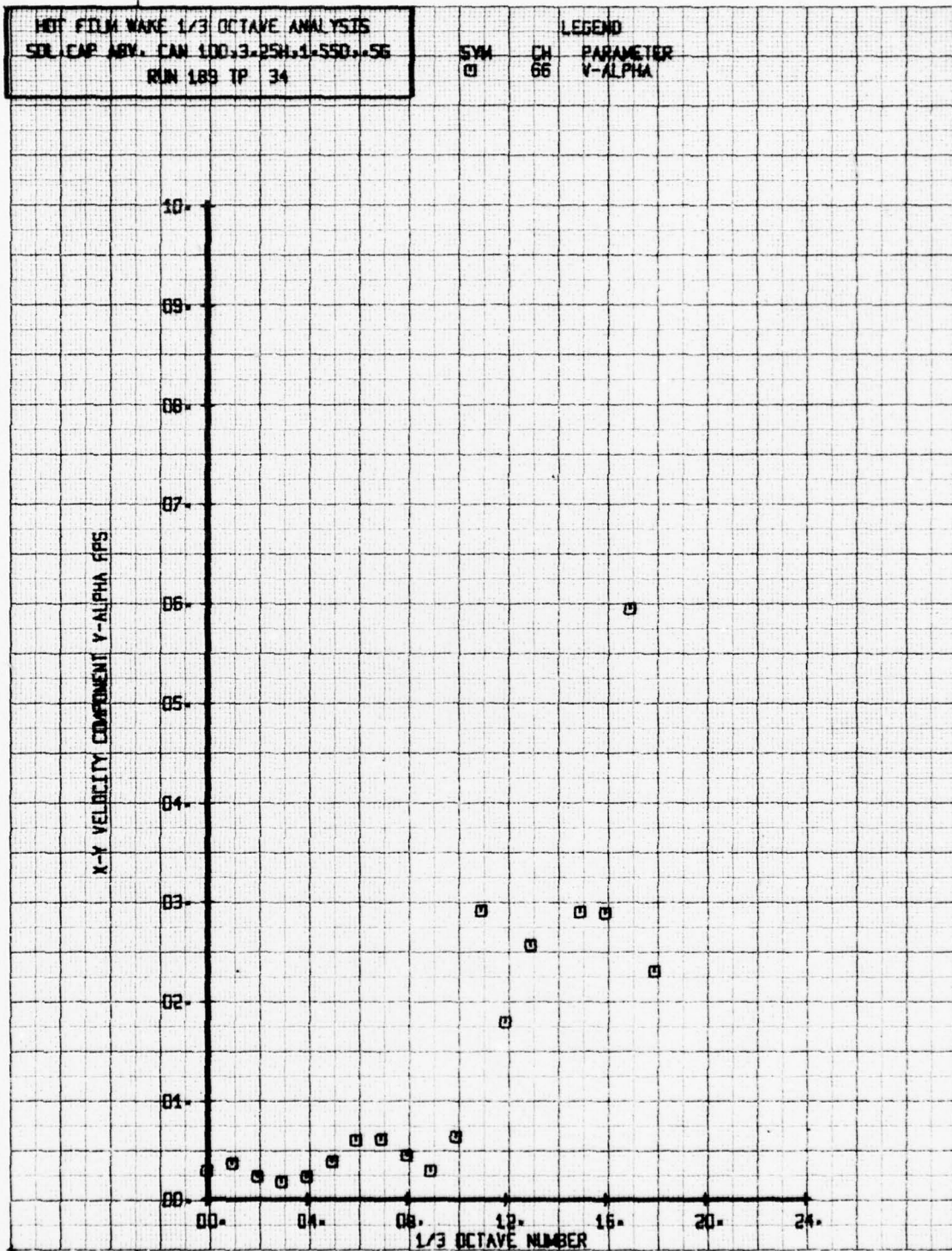
SYM CH PARAMETER
 □ 66 Y-ALPHA

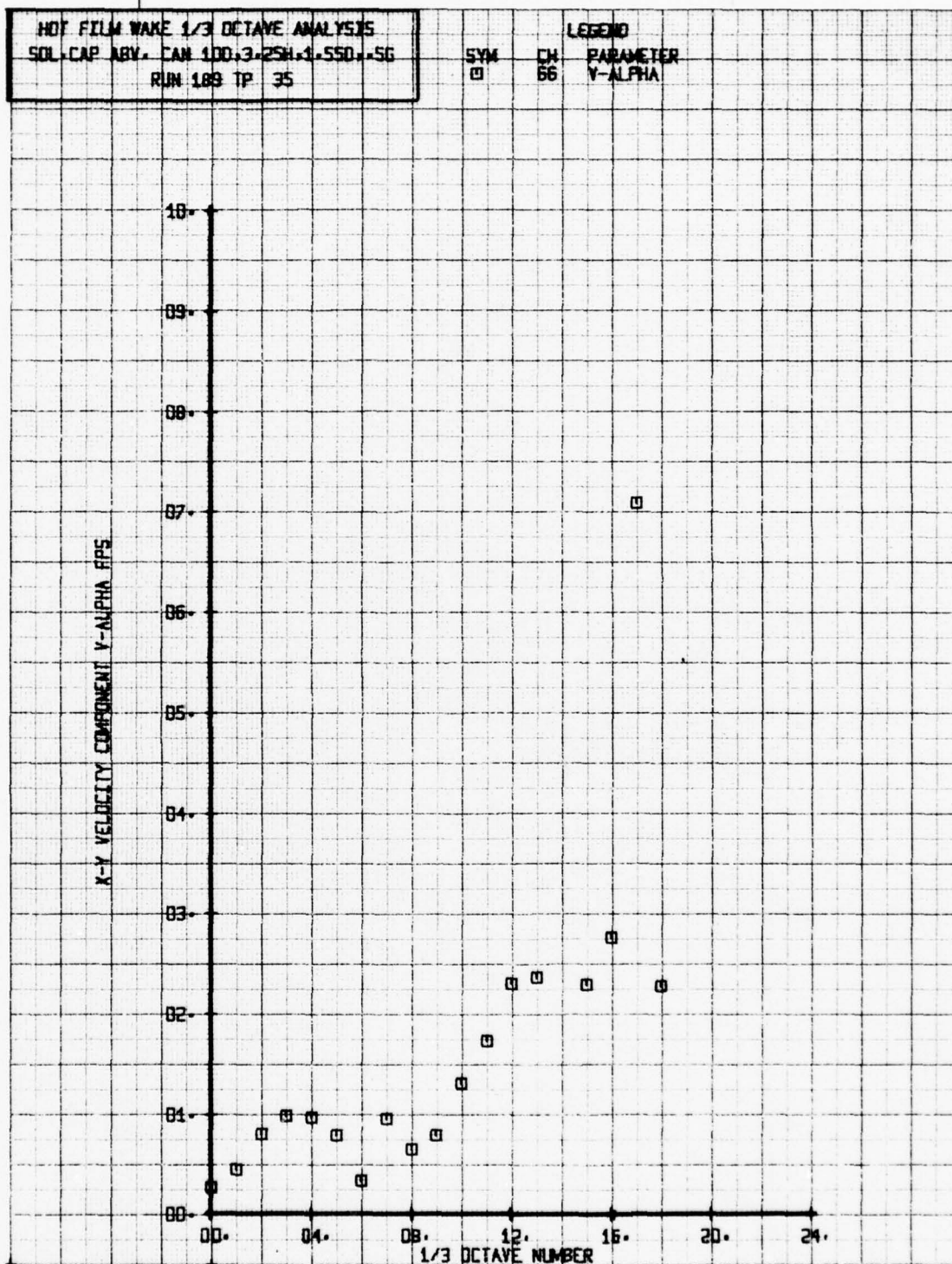




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY. CAN 100-3-25H-1-550-56
 RUN 189 TP 34

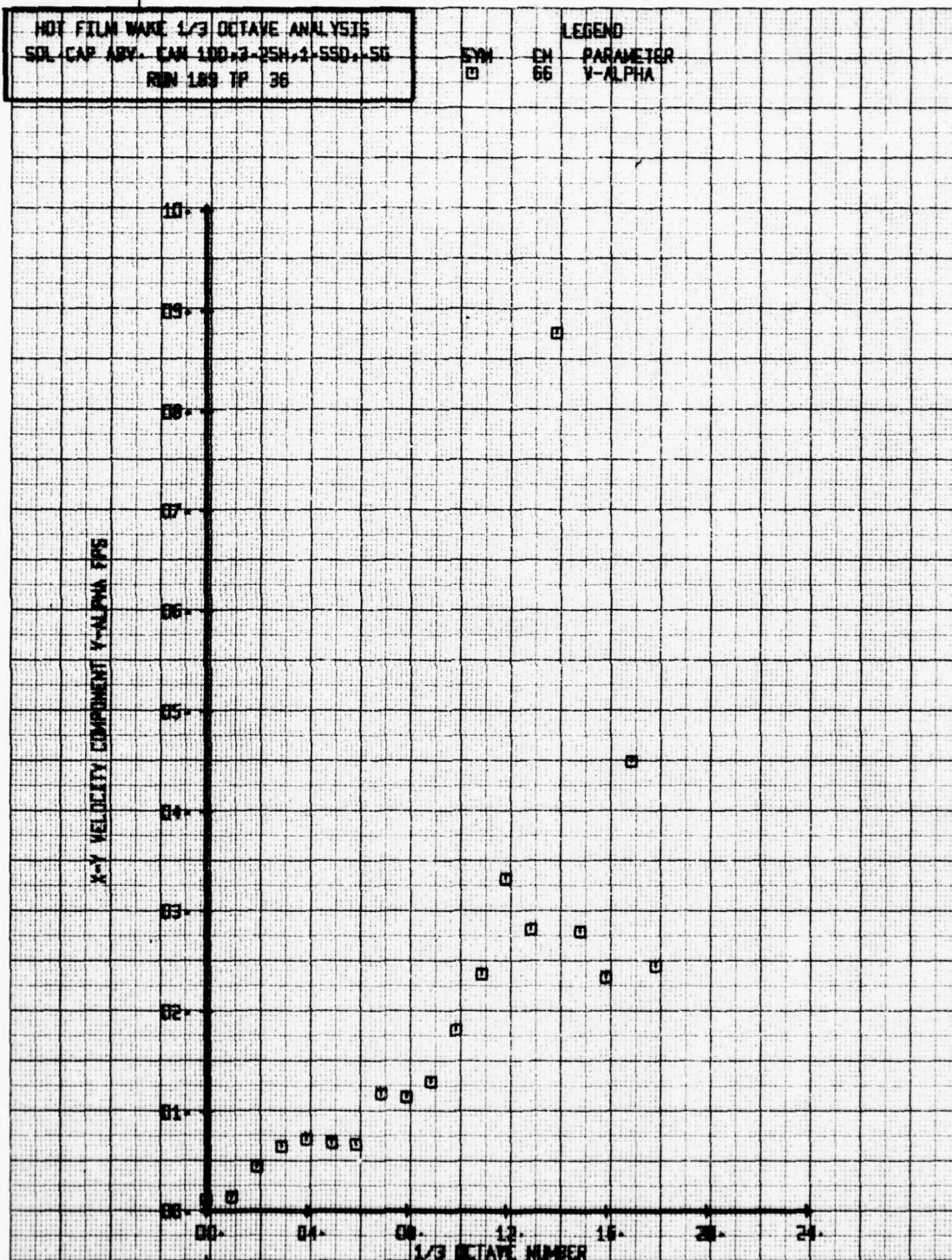
SYM CH PARAMETER
 □ 66 V-ALPHA





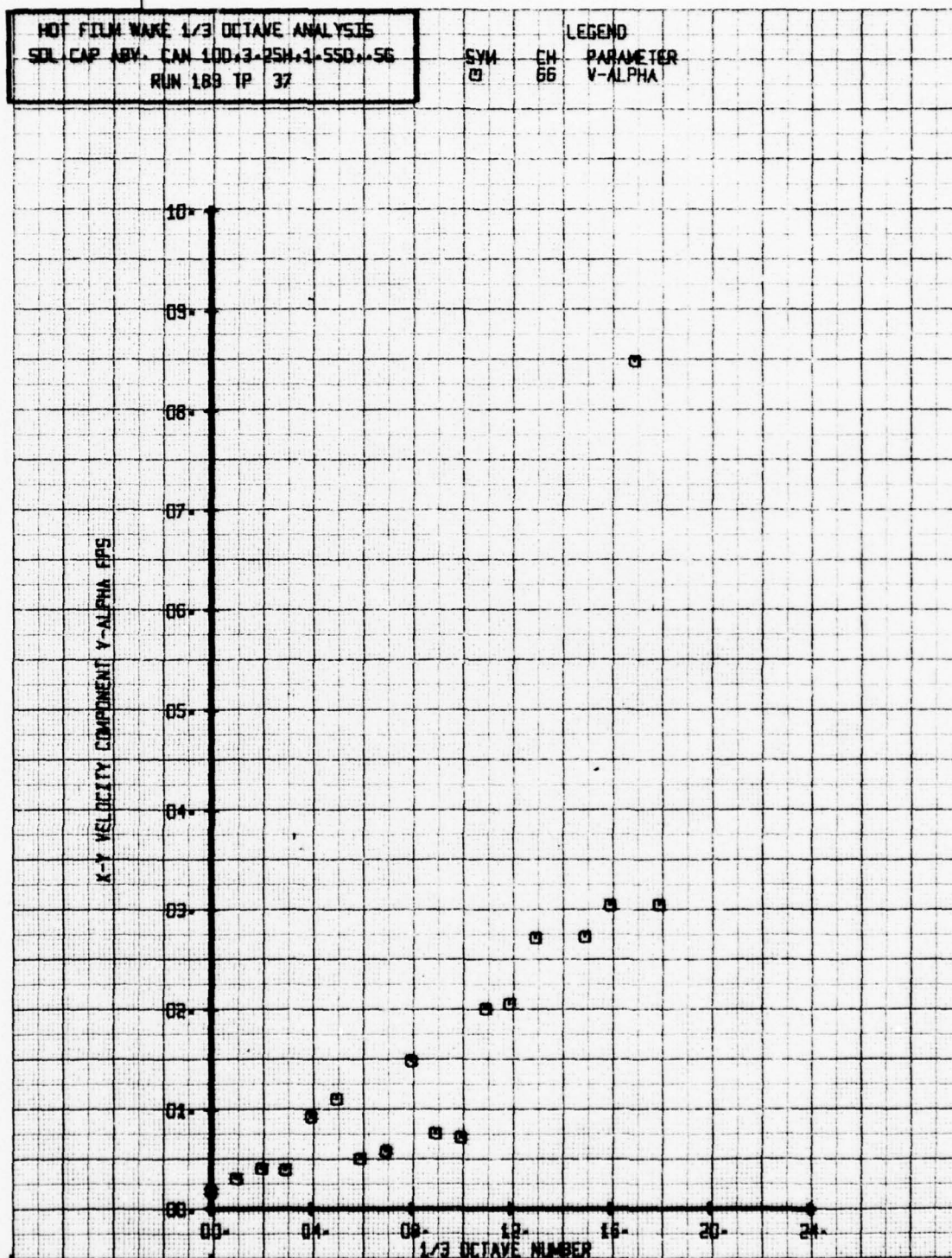
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100,3-25H,1-SSD,--5G
 RUN 189 TP 36

SYN CH
 □ 66
 LEGEND
 PARAMETER
 V-ALPHA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY. CAN 100-3-25H-1-550--56
 RUN 189 TP 37

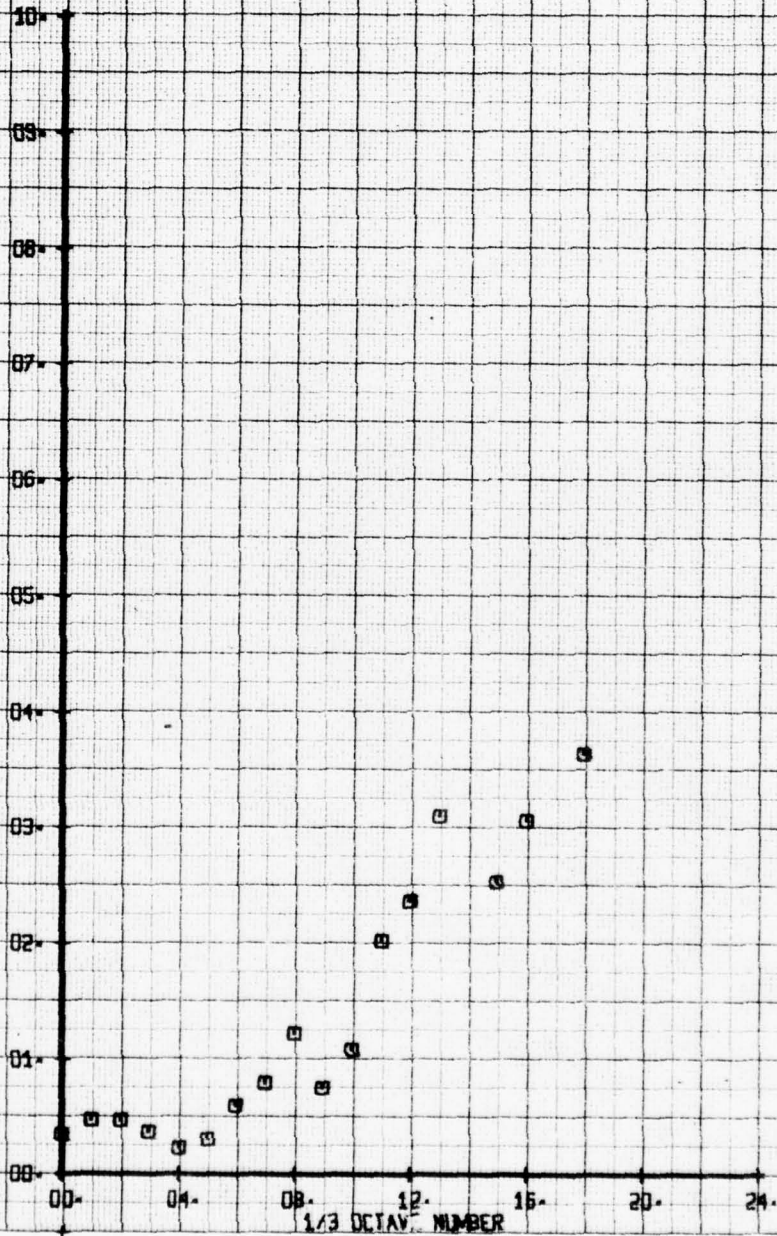
SYM CH PARAMETER
 □ 66 V-ALPHA



HET FILM WARE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100.3-25H.1-550.-56
 RUN 189 TP 38

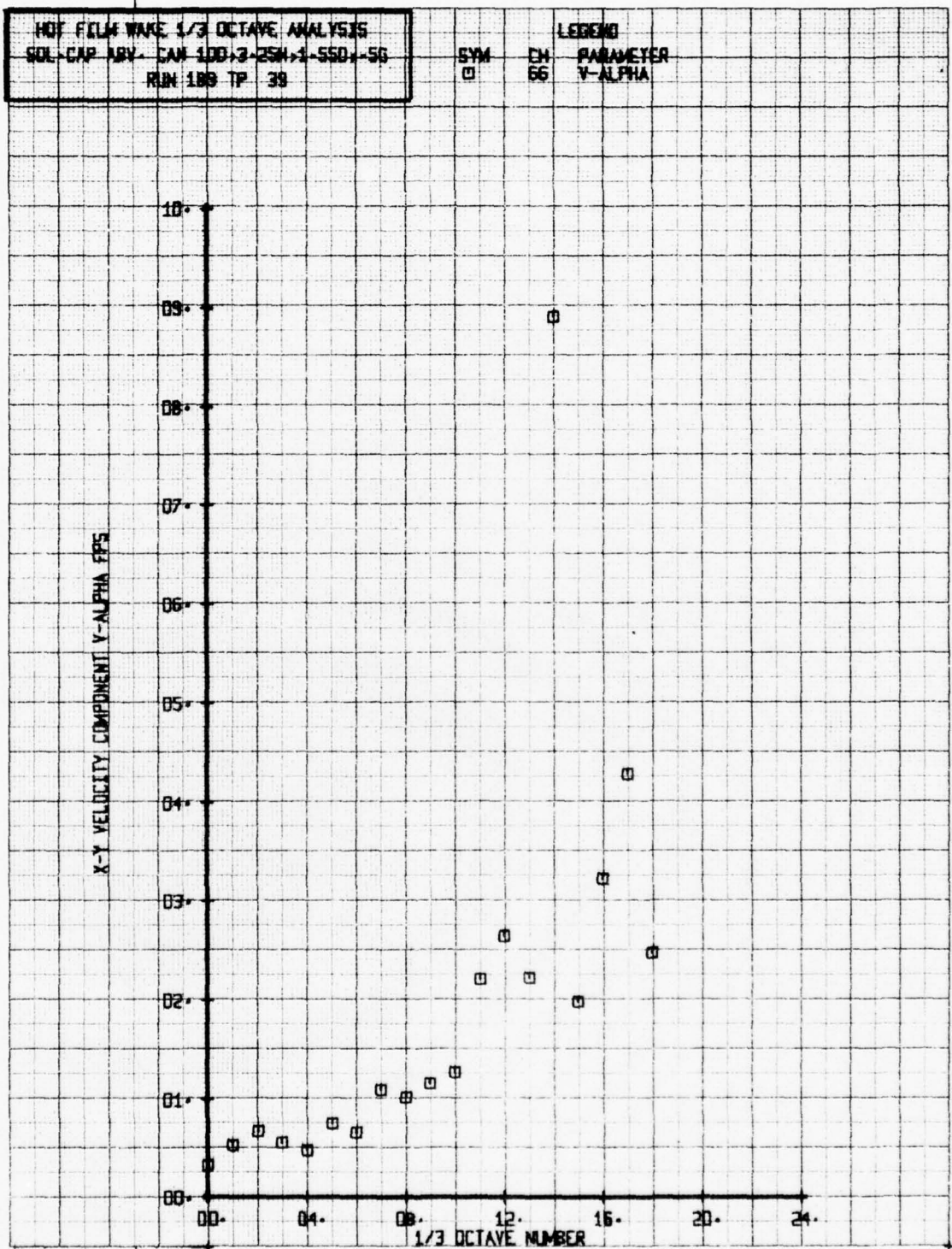
LEGEND
 SYM CH PARAMETER
 □ 66 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA FPS



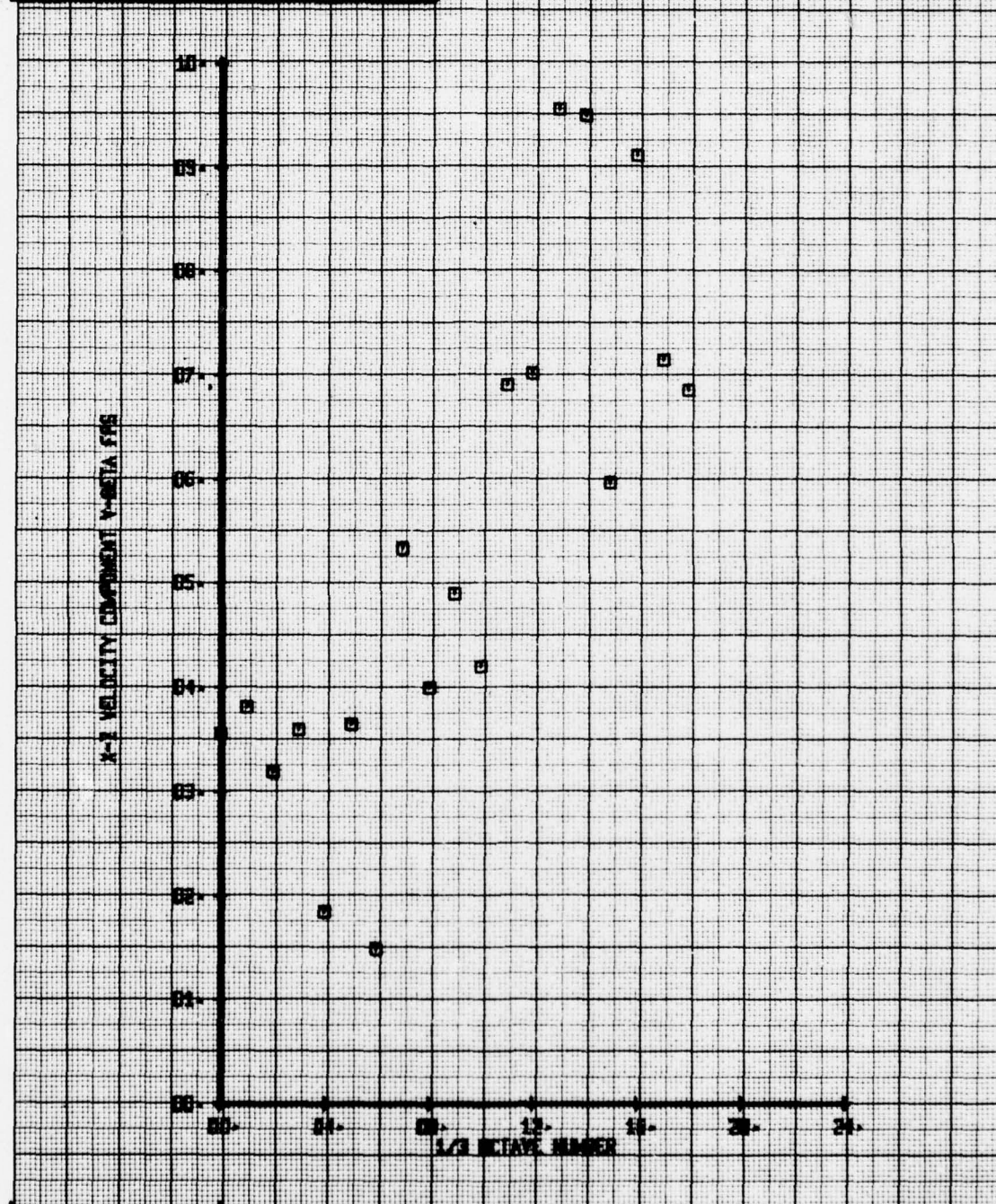
NOF FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ARV CAN 100-2-25H-1-550-50
 RUN 189 TP 38

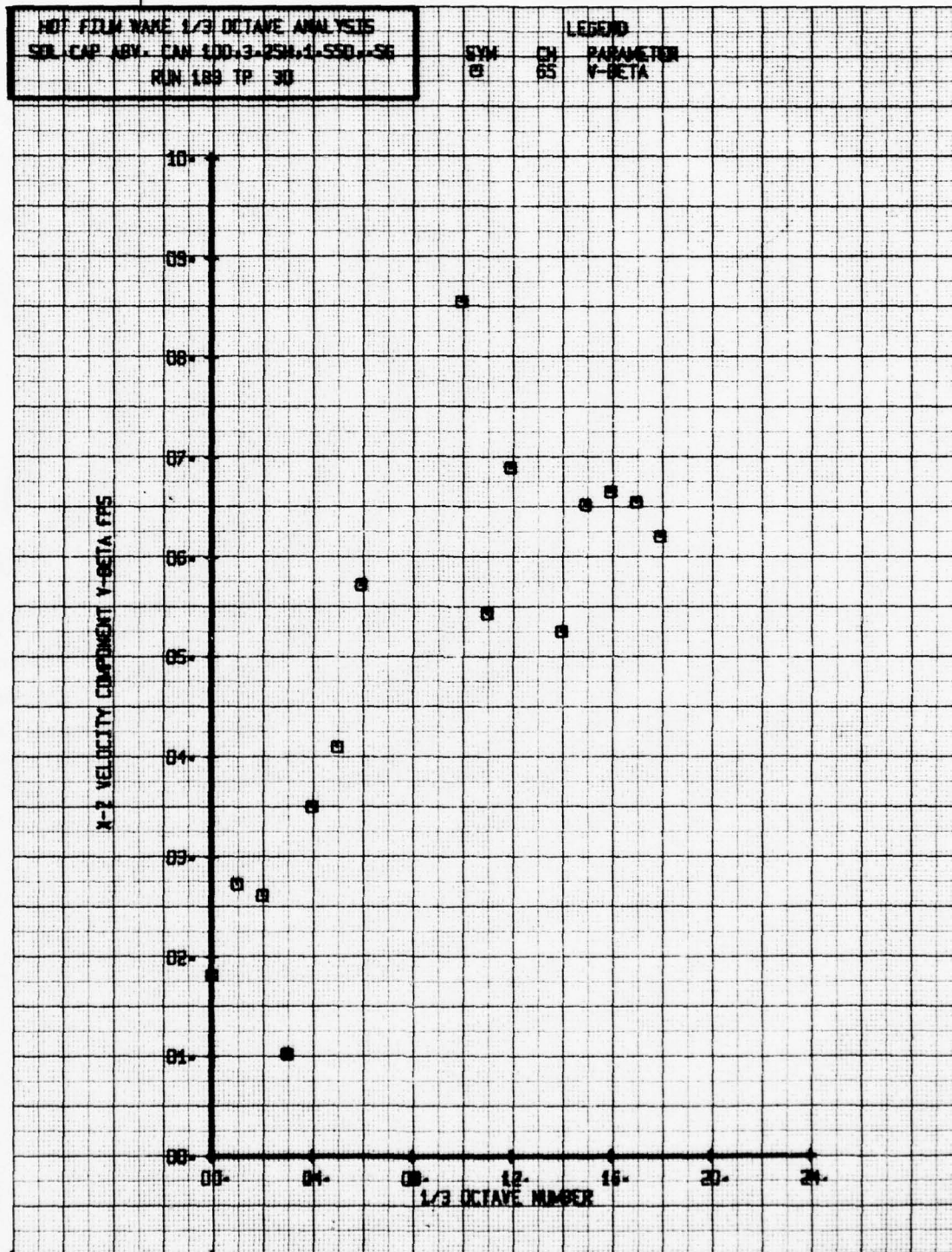
SYM CH PARAMETER
 □ 66 V-ALPHA



HOI FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100.3-25H-1-550-56
 RUN 189 IP 29

LEGEND
 CH 65
 PARAMETER
 V-BETA

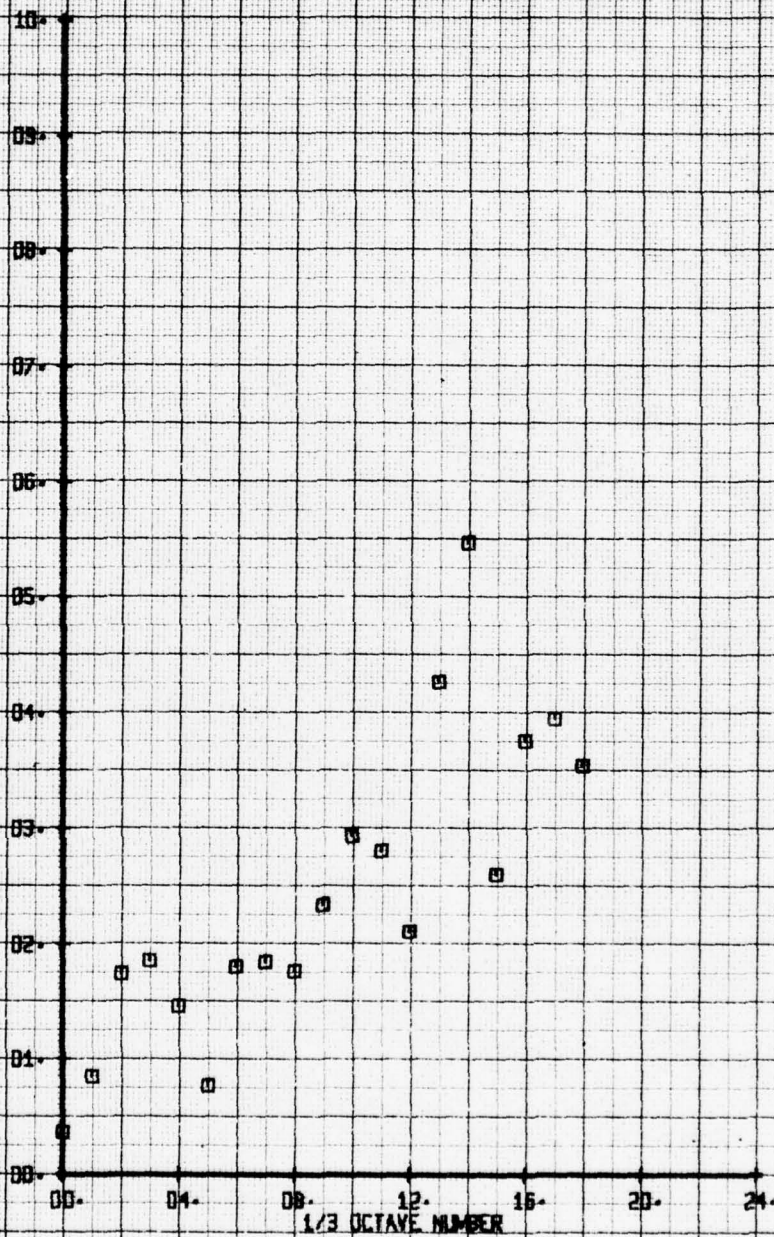


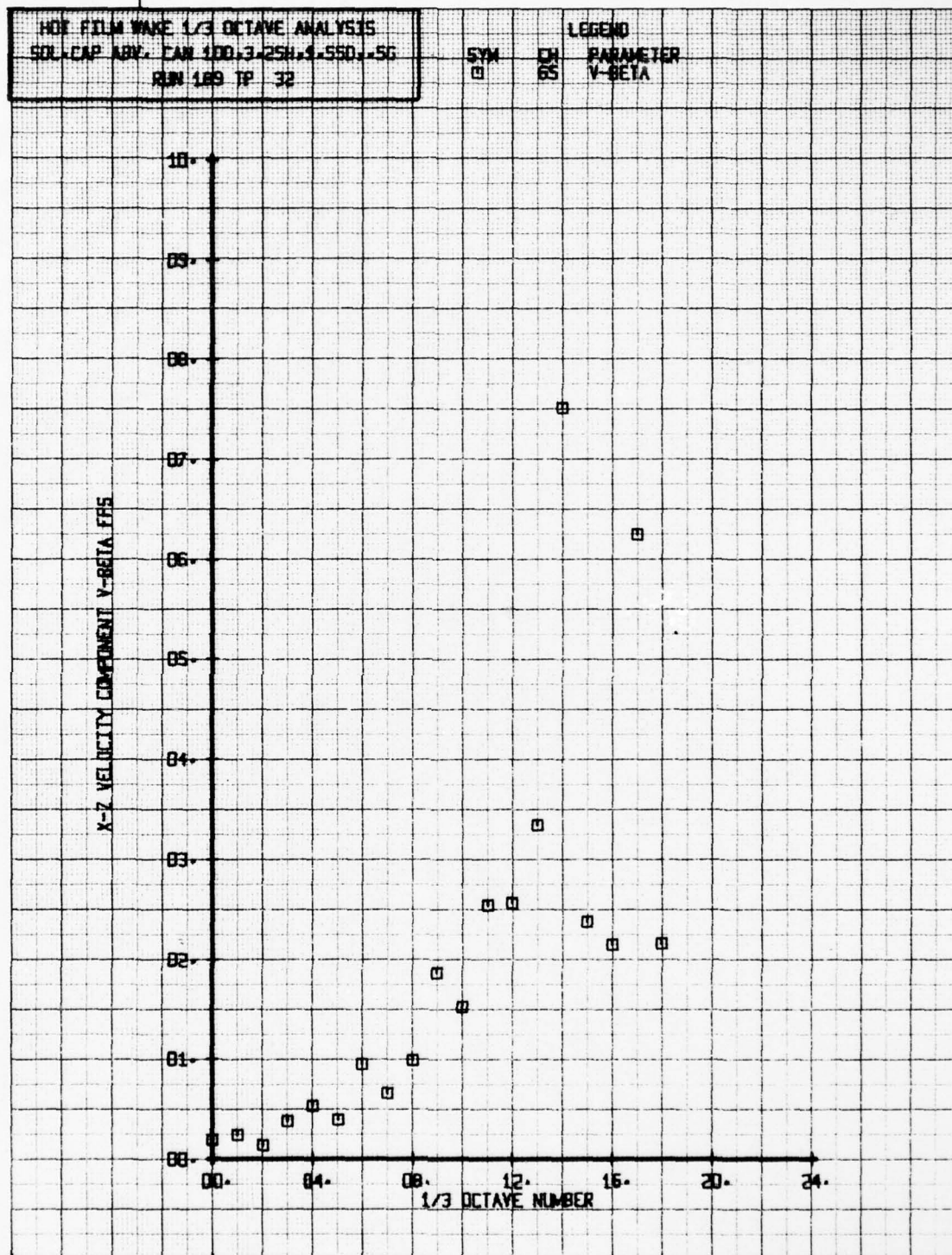


NOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ADV. CAN 100-3-25M-4-550-56
 RUN 189 TP 31

LEGEND
 SYM CH PARAMETER
 □ 65 Y-BETA

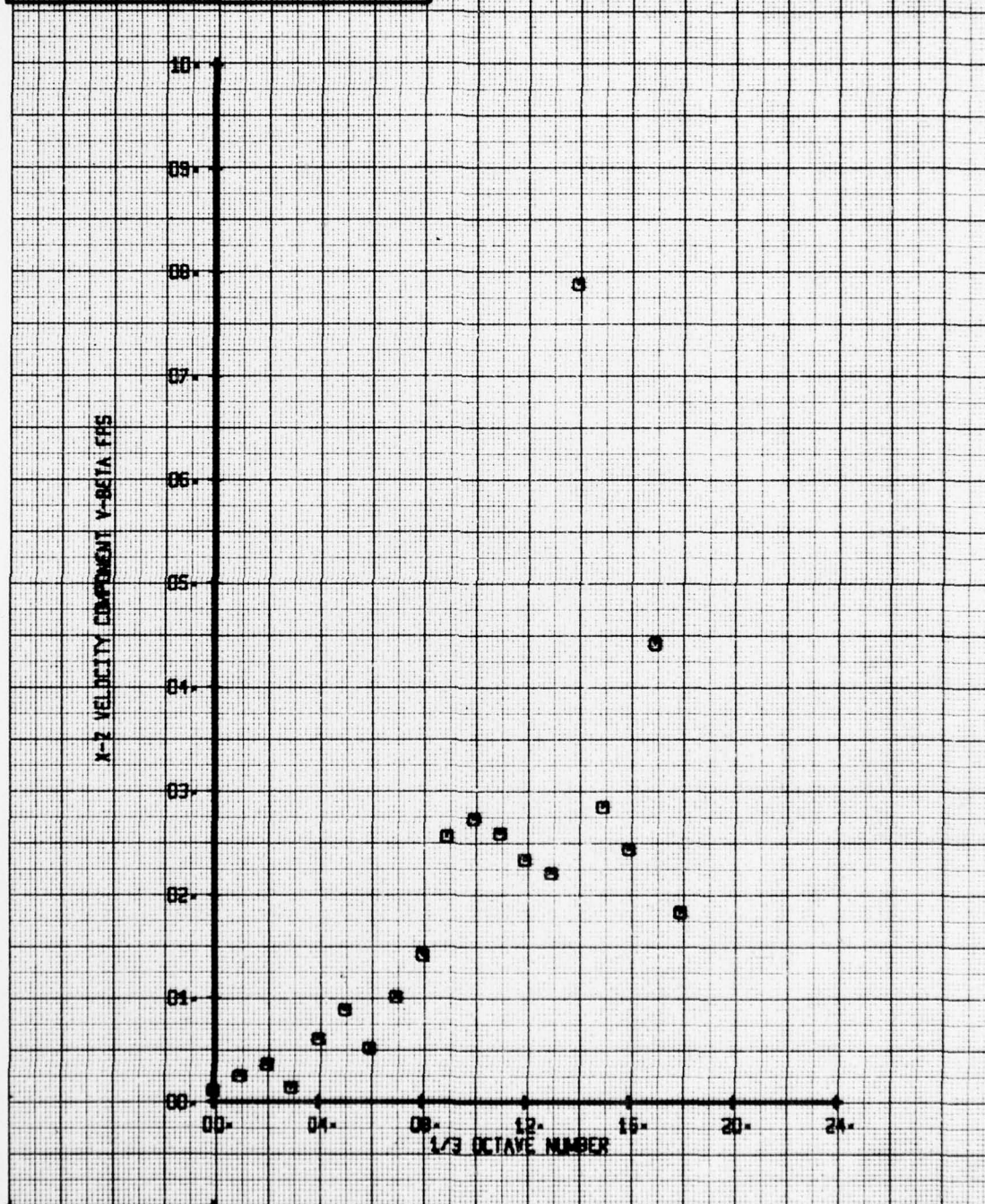
X-Z VELOCITY COMPONENT Y-BETA FPS

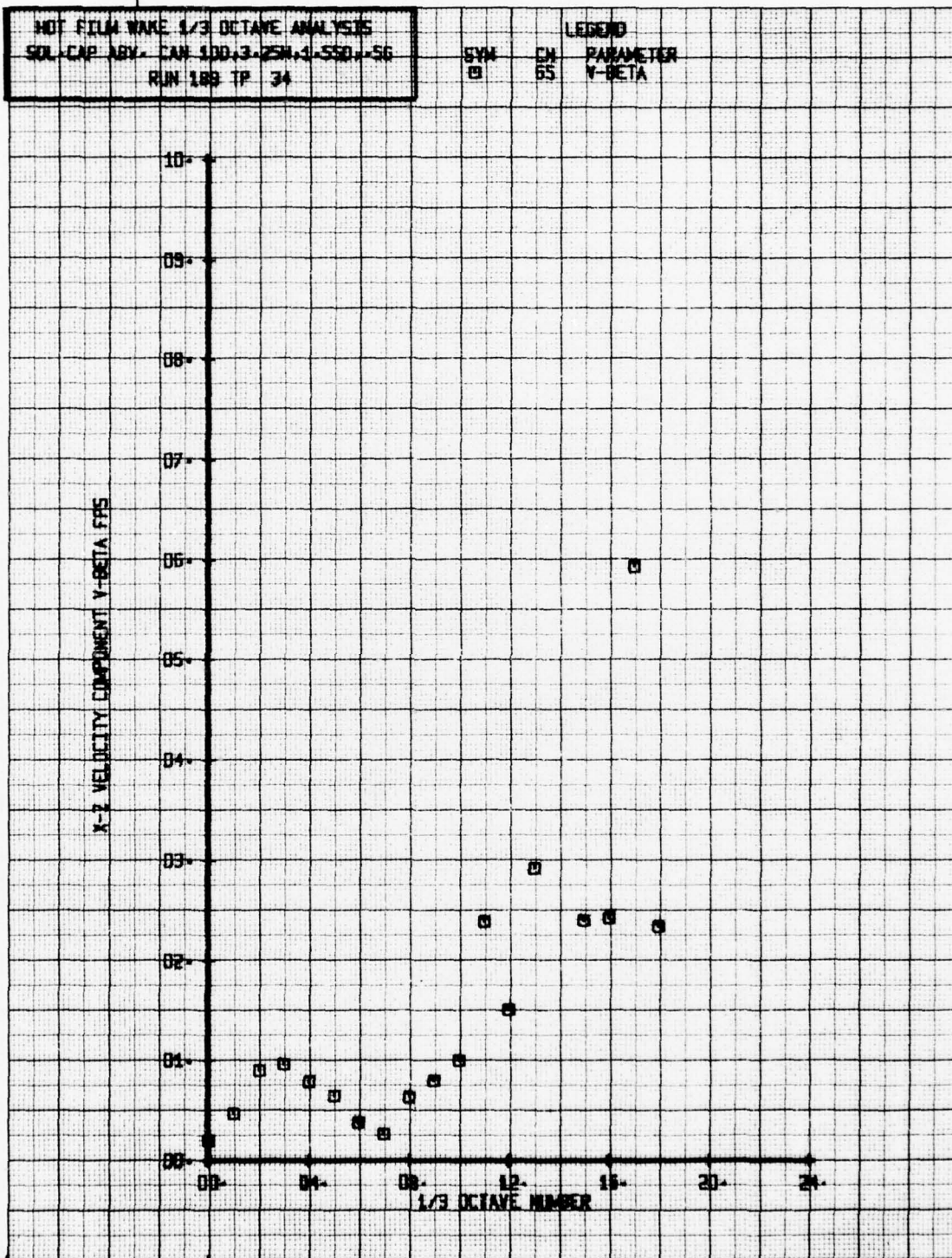


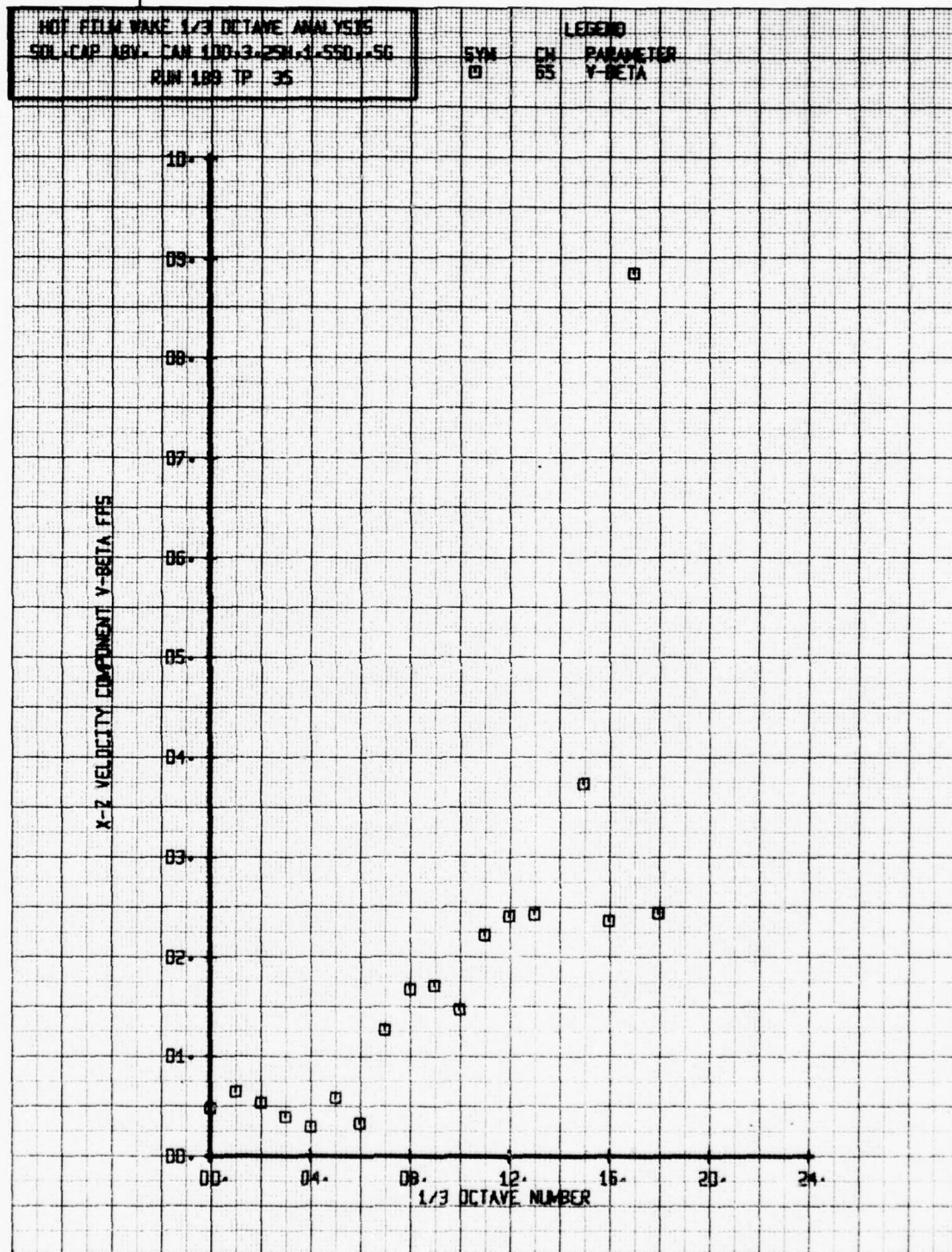


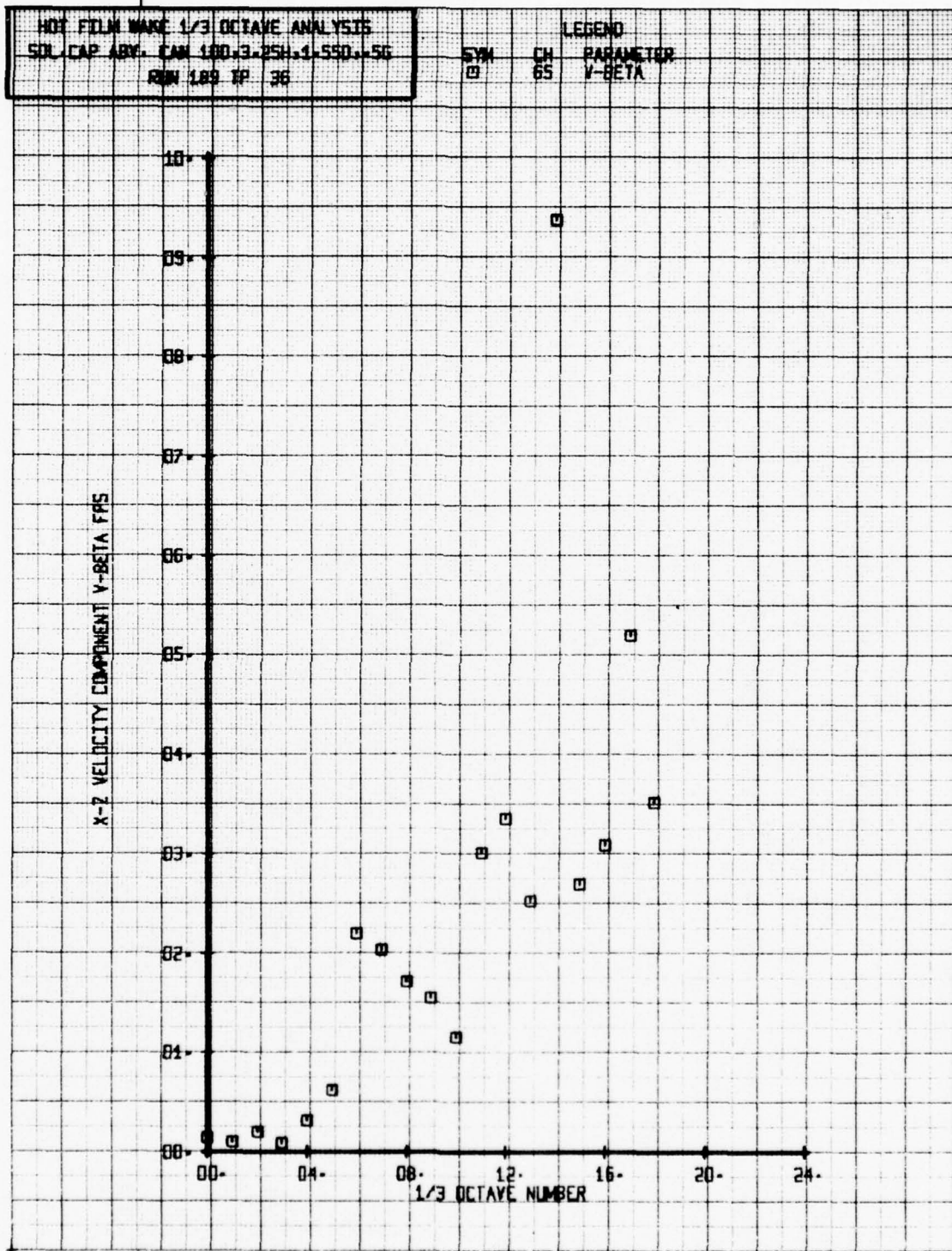
NET FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY. CAN 100.3-25H.1-550.-56
 RUN 189 TP 33

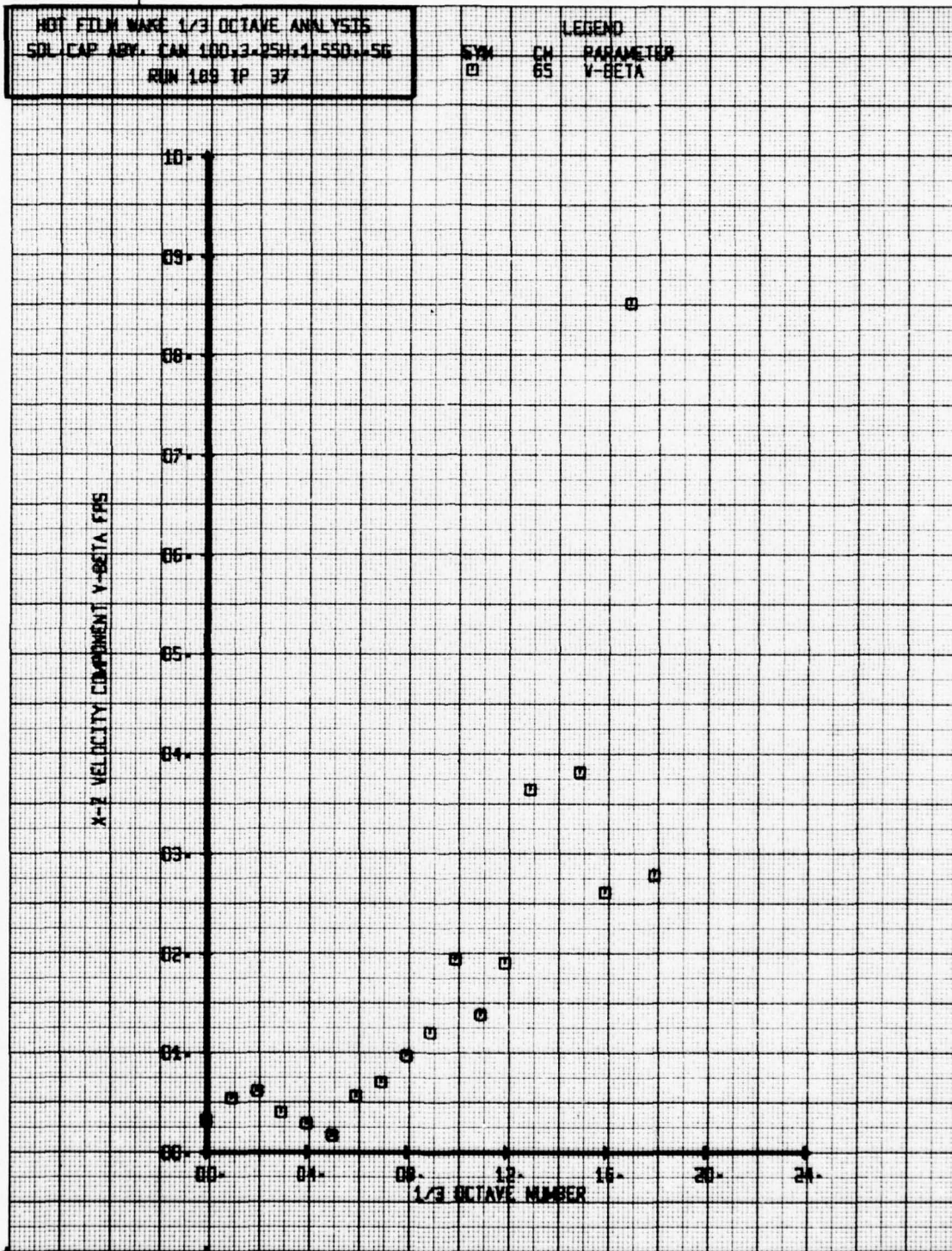
LEGEND
 SYM CH PARAMETER
 25 65 V-BETA







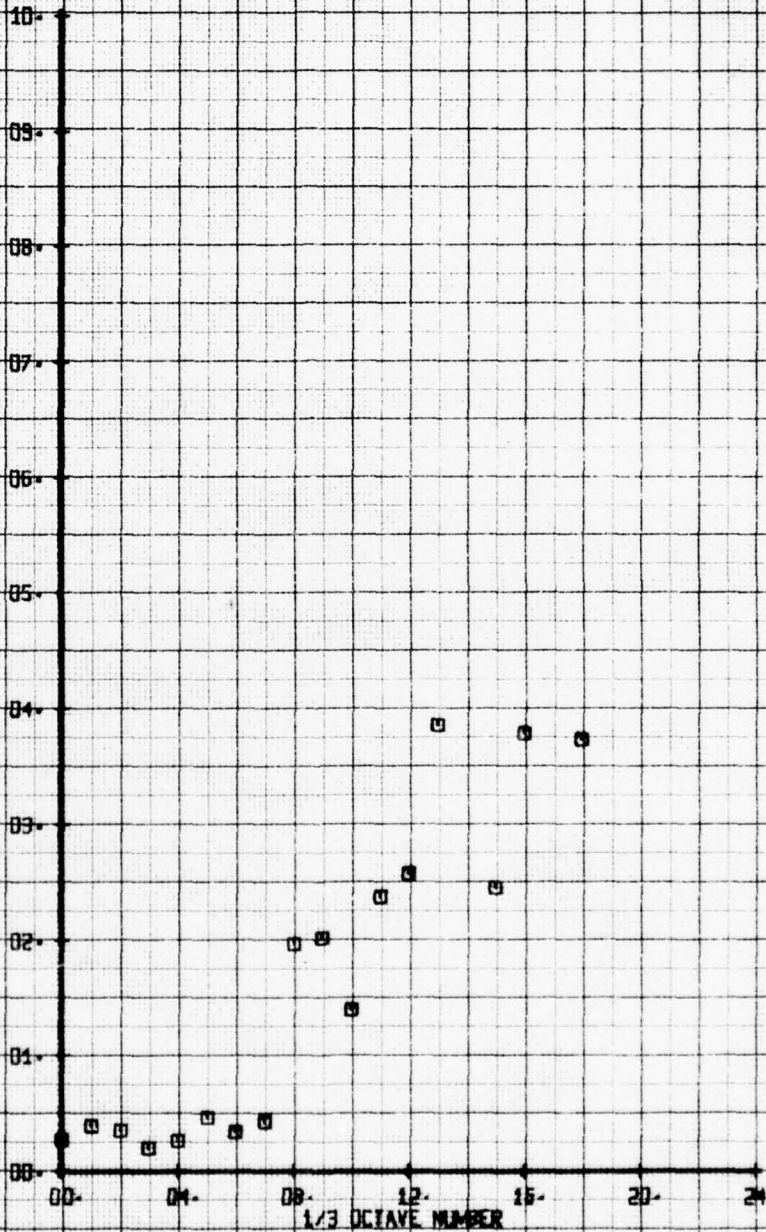


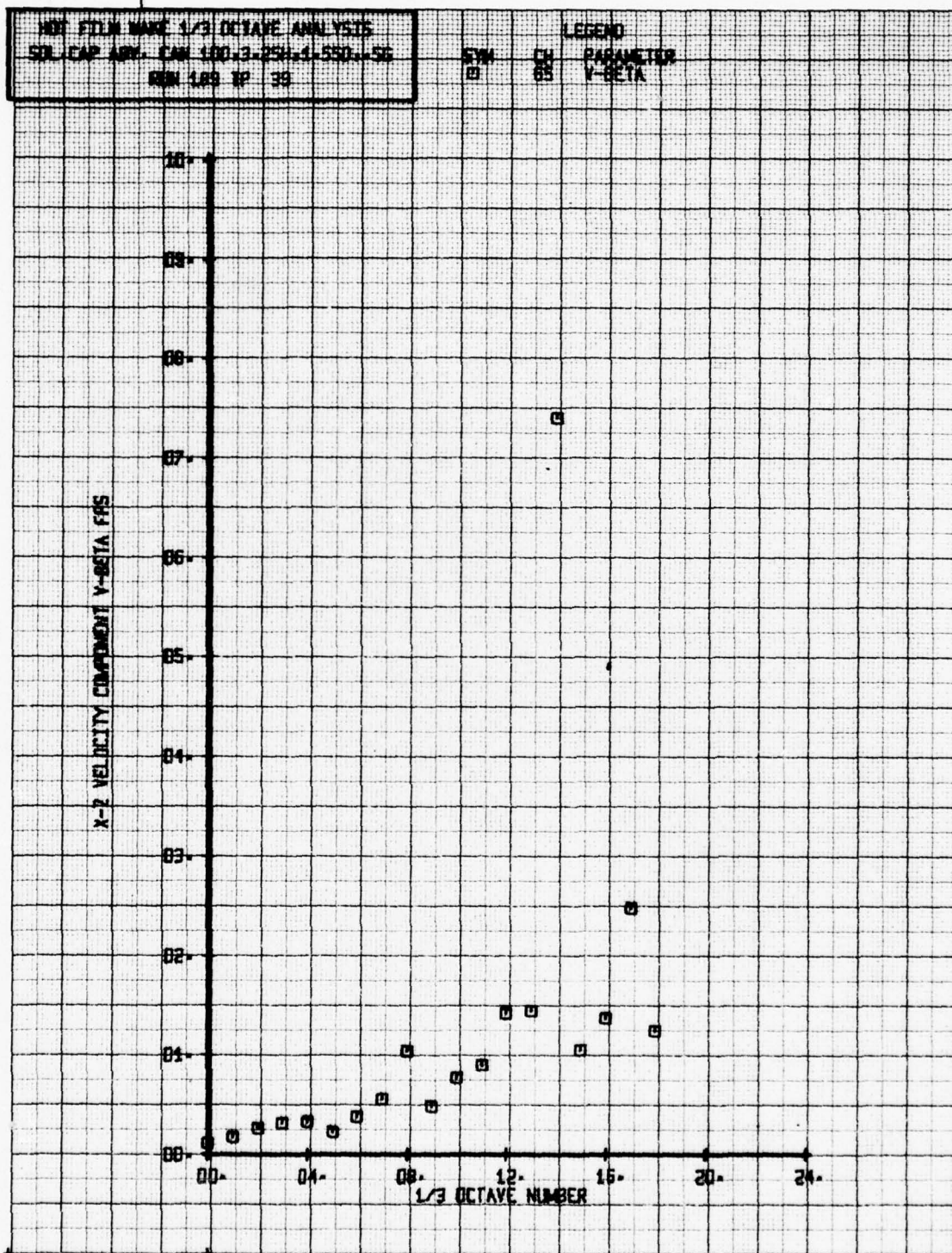


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABV. CAN 100-3-25H-1-SSQ-SG
 RUN 188 TP 38

LEGEND
 SYM CH PARAMETER
 □ 65 V-BETA

X-Z VELOCITY COMPONENT V-BETA FPS

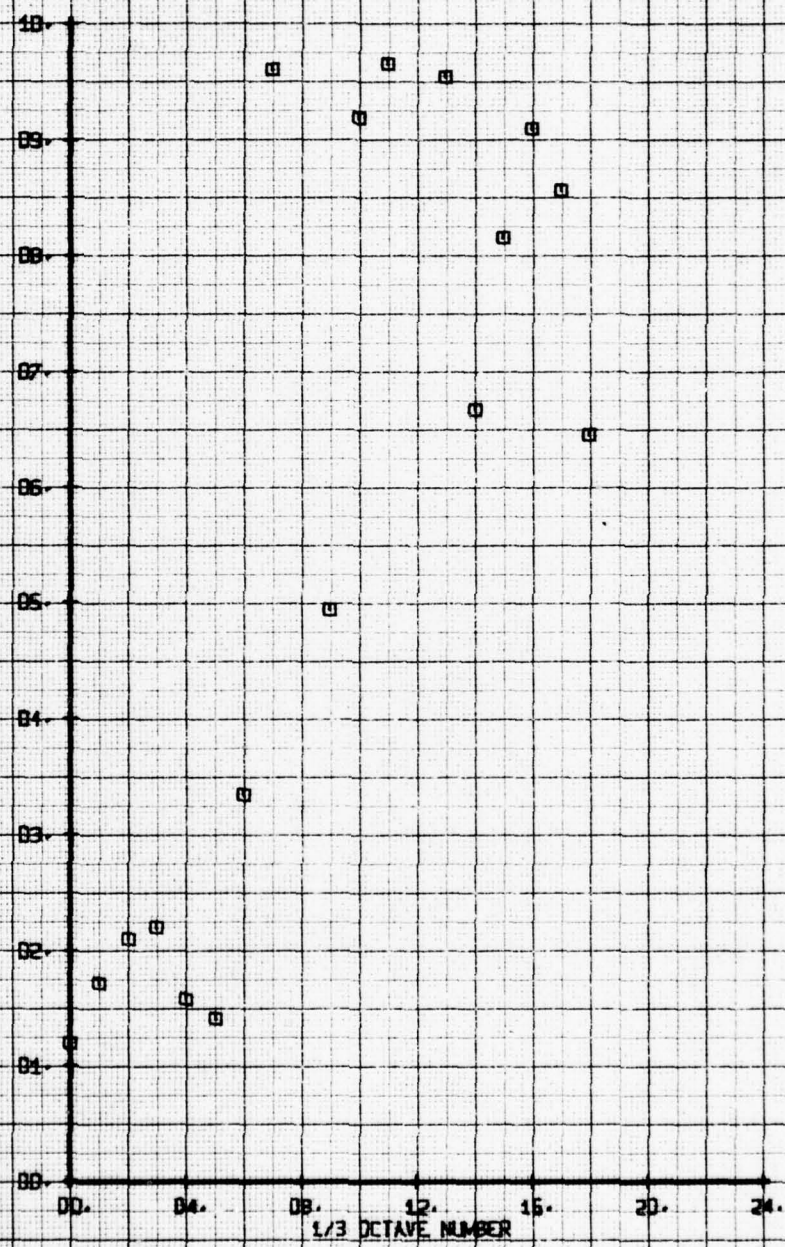


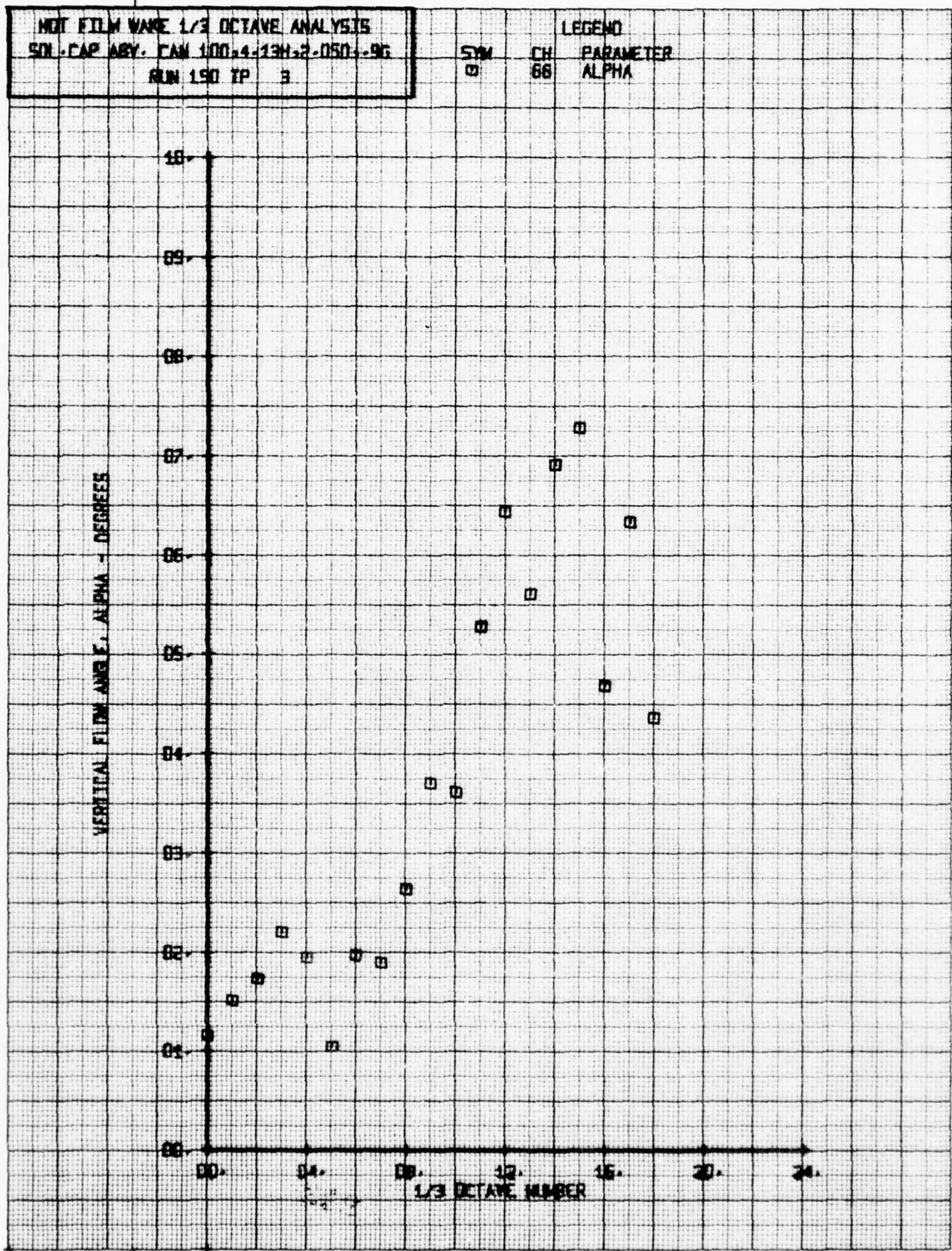


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.4-13M.2-050.-96
 RUN 190 TP 2

SYM CH
 0 66
 PARAMETER
 ALPHA

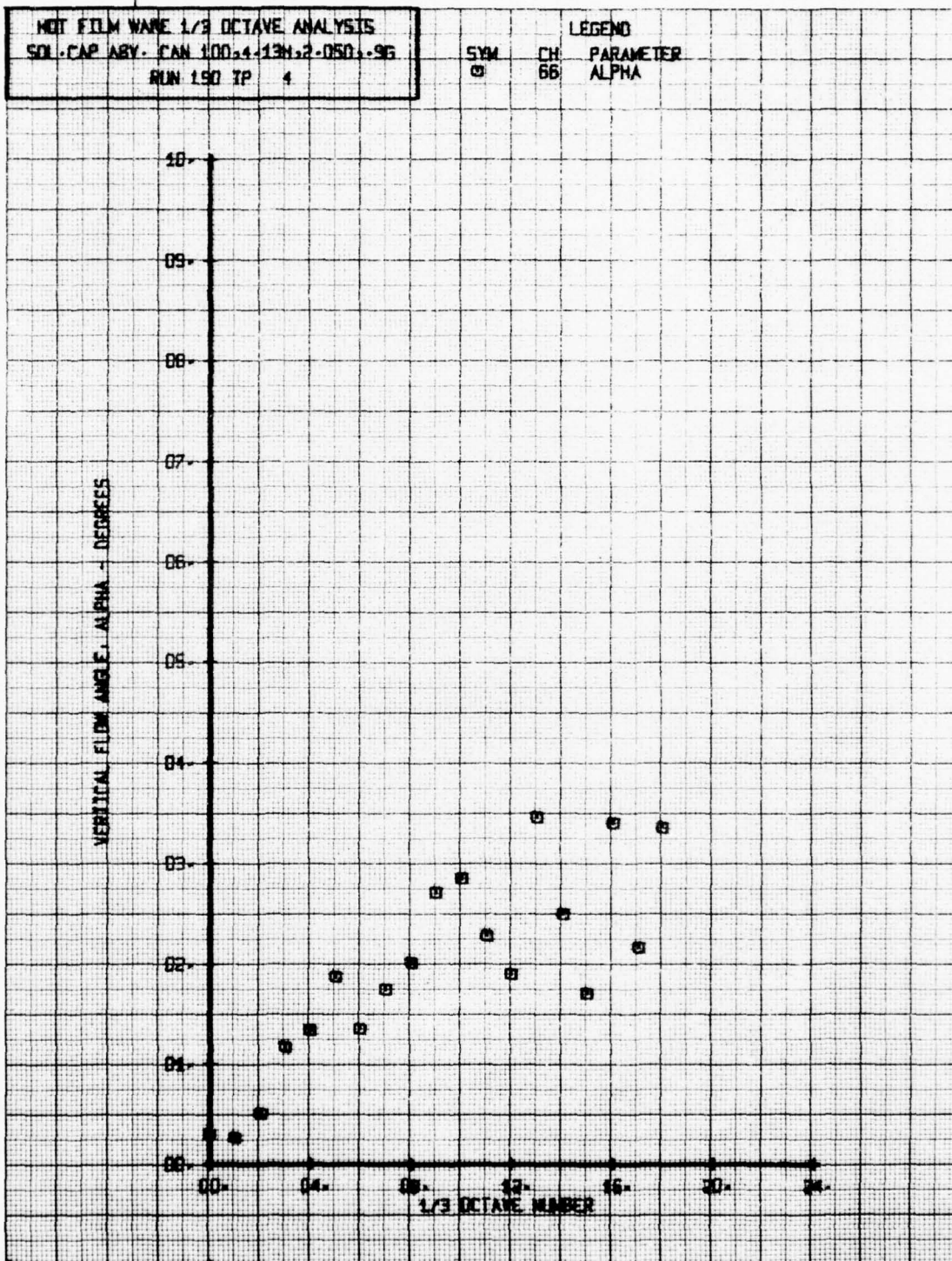
VERTICAL FLOW ANGLE, ALPHA - DEGREES

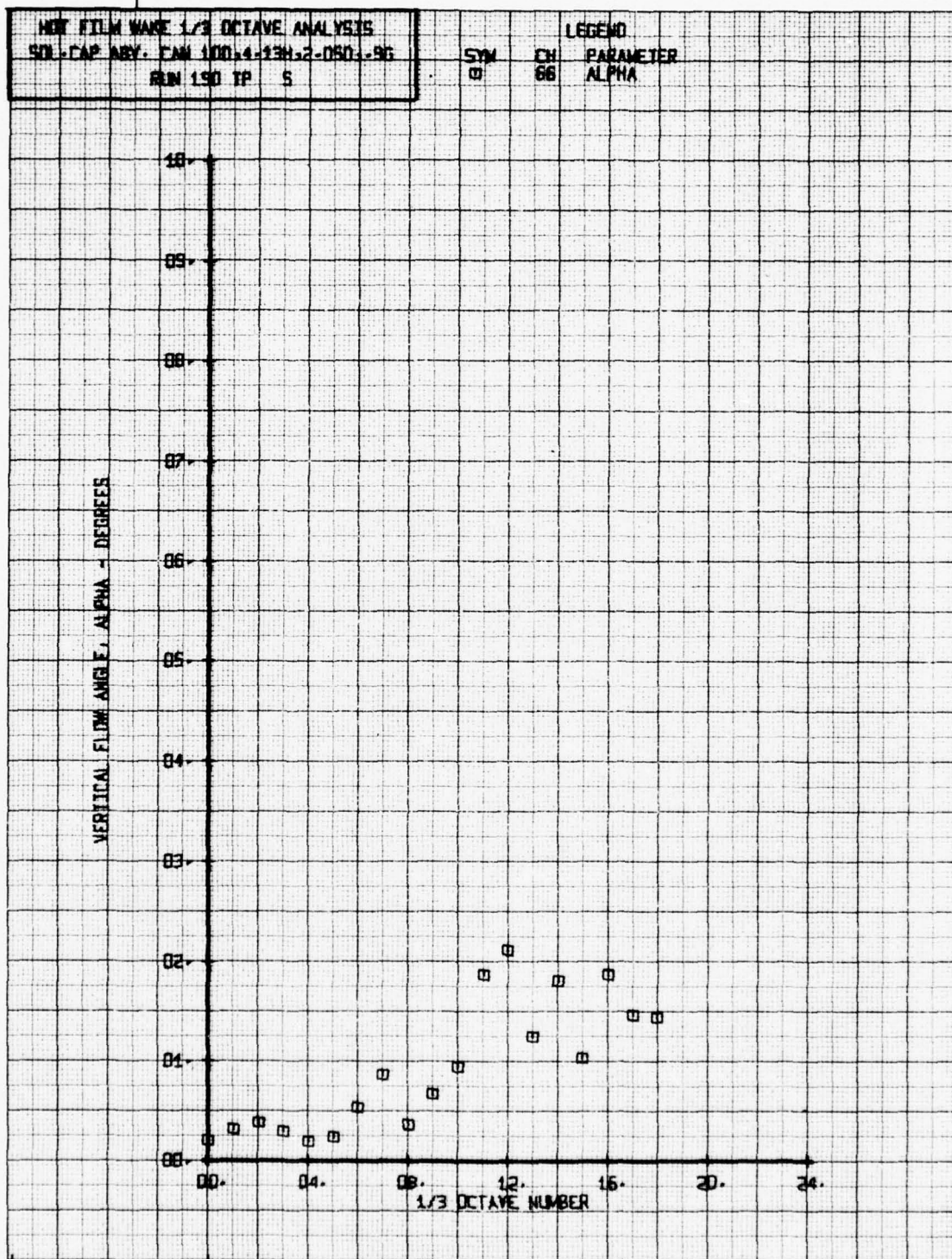




NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.4.13H.2.050..96
 RUN 150 TP 4

SYM CH PARAMETER
 0 66 ALPHA

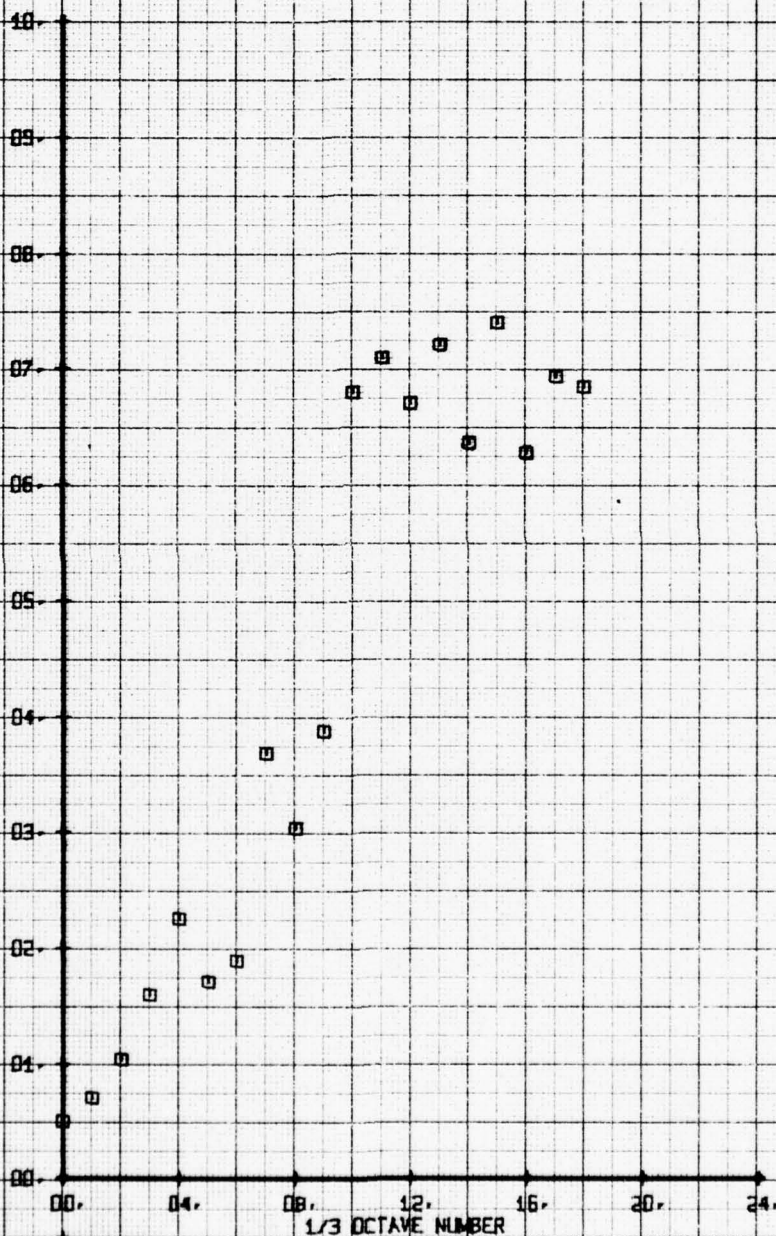




HOT FILM WARE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARV. CAM 100.4-13H.2-050.-96
 RUN 190 TP 2

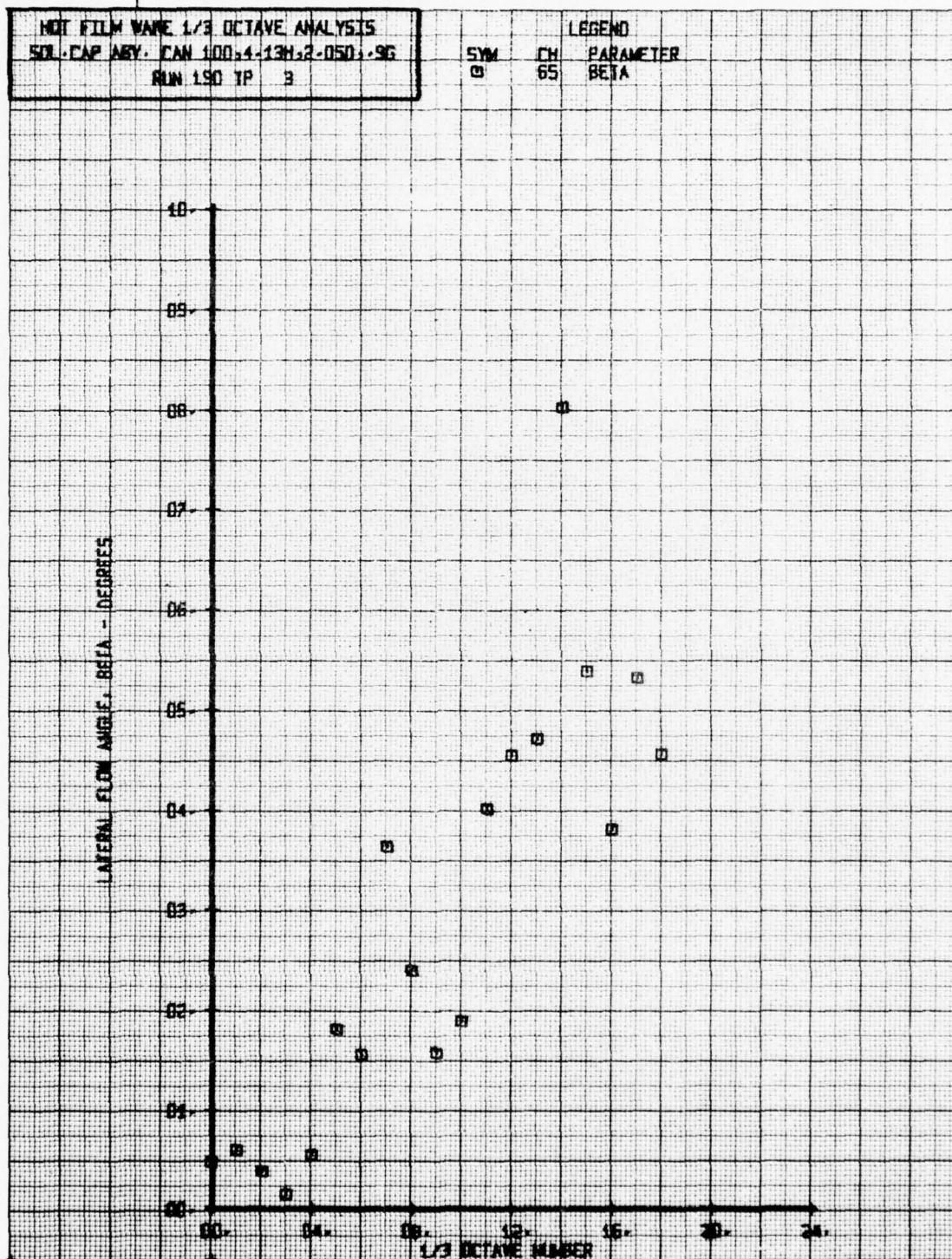
LEGEND
 CH 65
 PARAMETER
 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



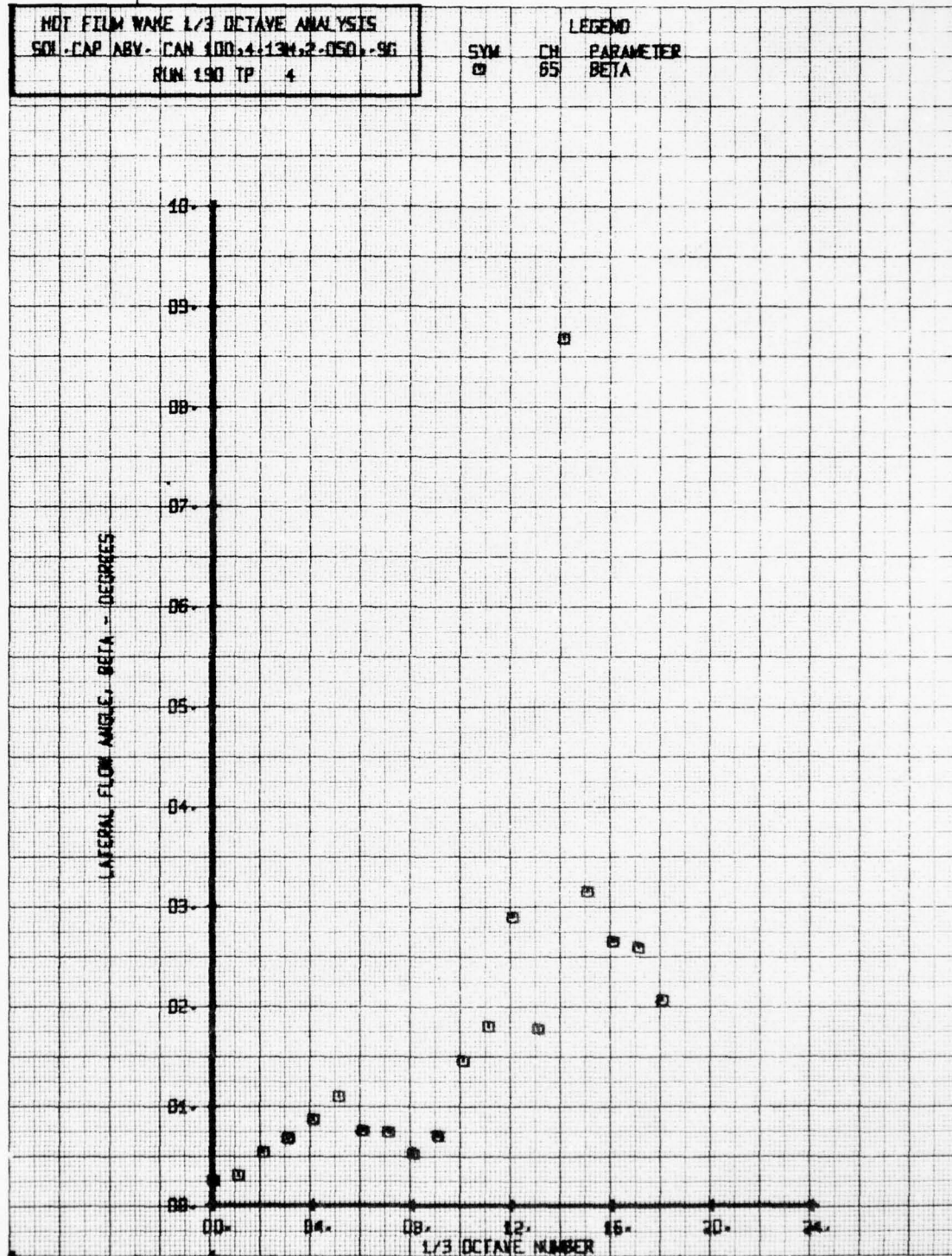
NOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100,4-13H,2-050,96
 RUN 190 TP 3

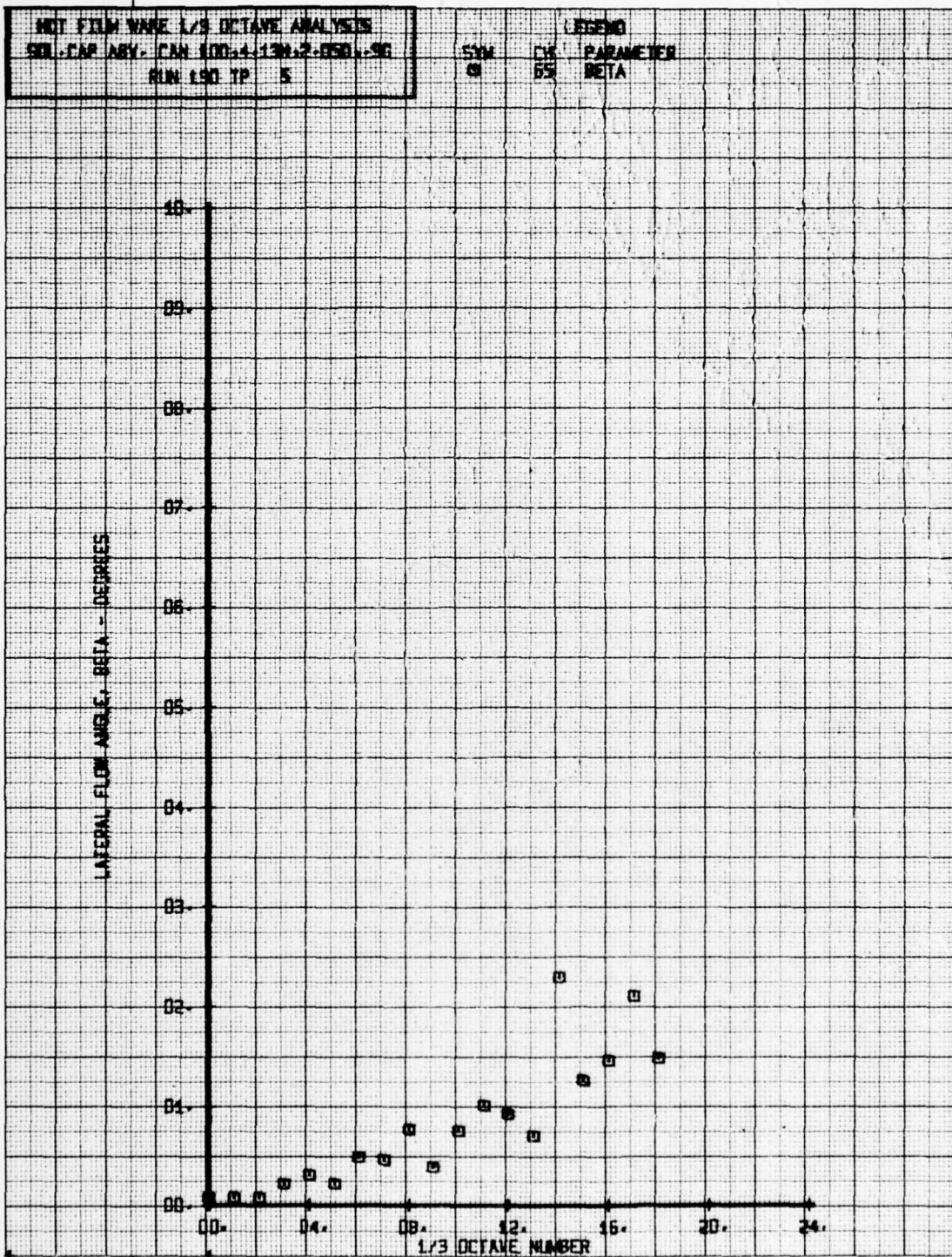
LEGEND
 SYM CH PARAMETER
 0 65 BETA

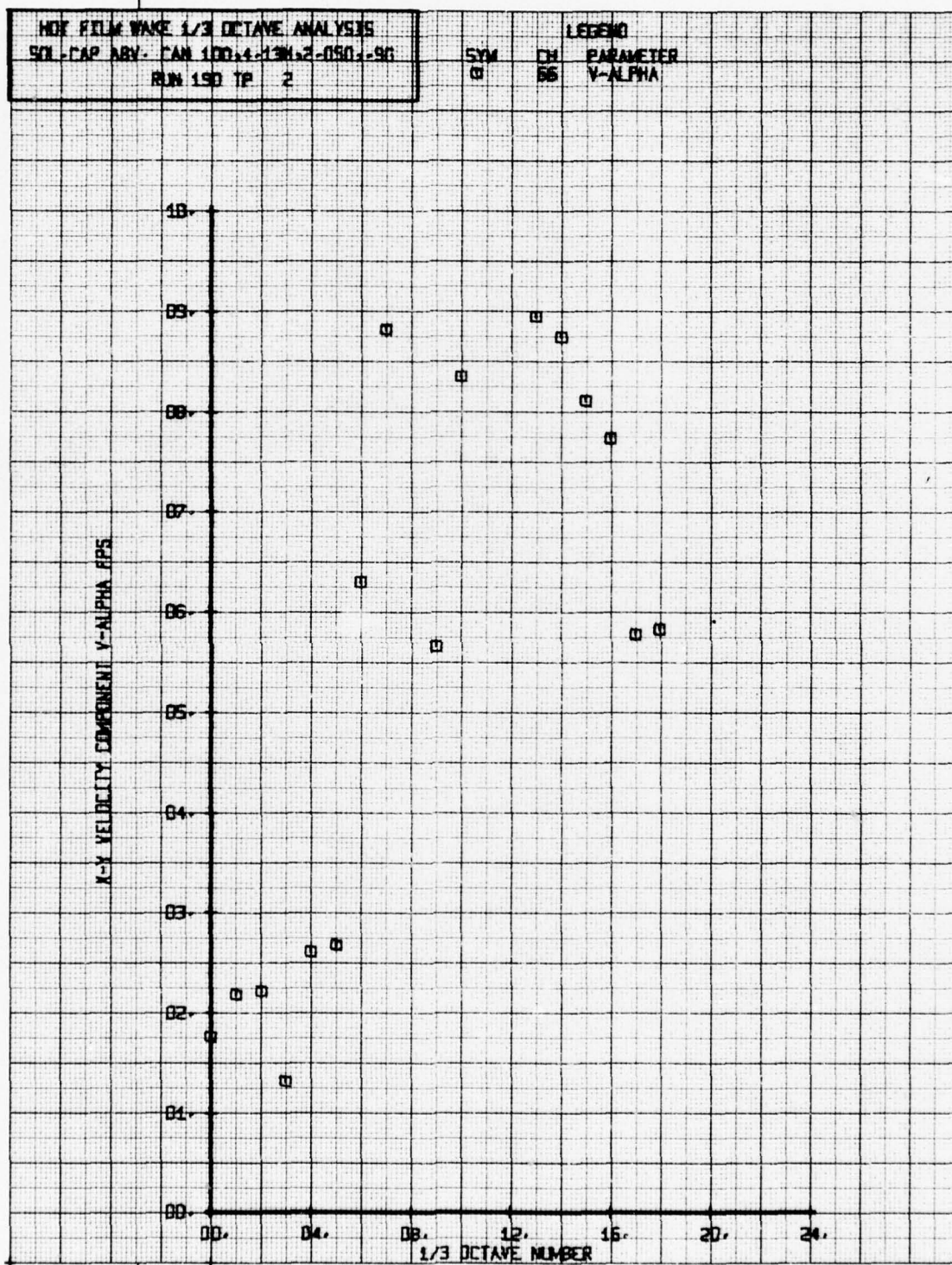


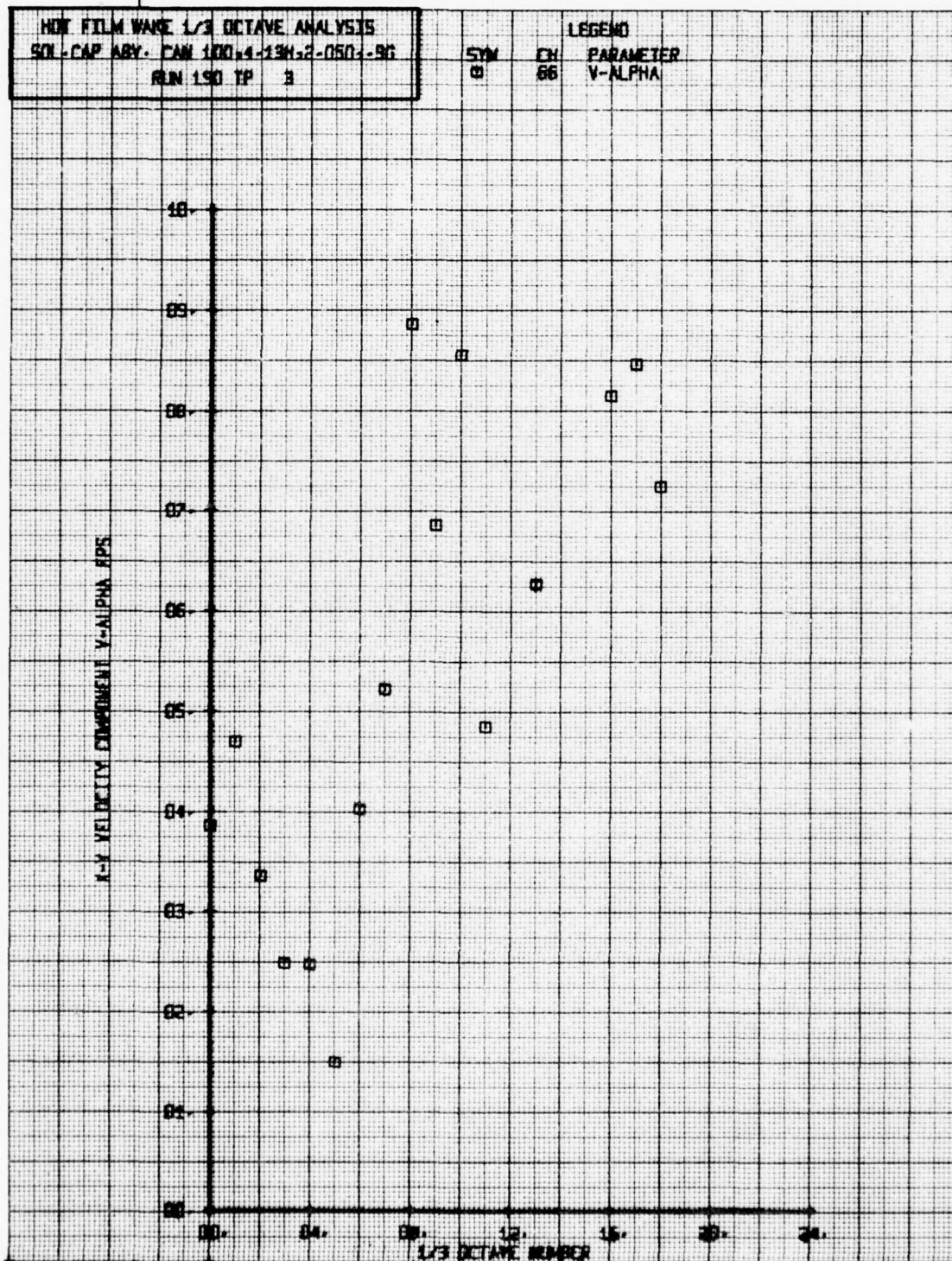
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.4-134.2-050.96
 RUN 190 TP 4

SYM CH PARAMETER
 □ 65 BETA



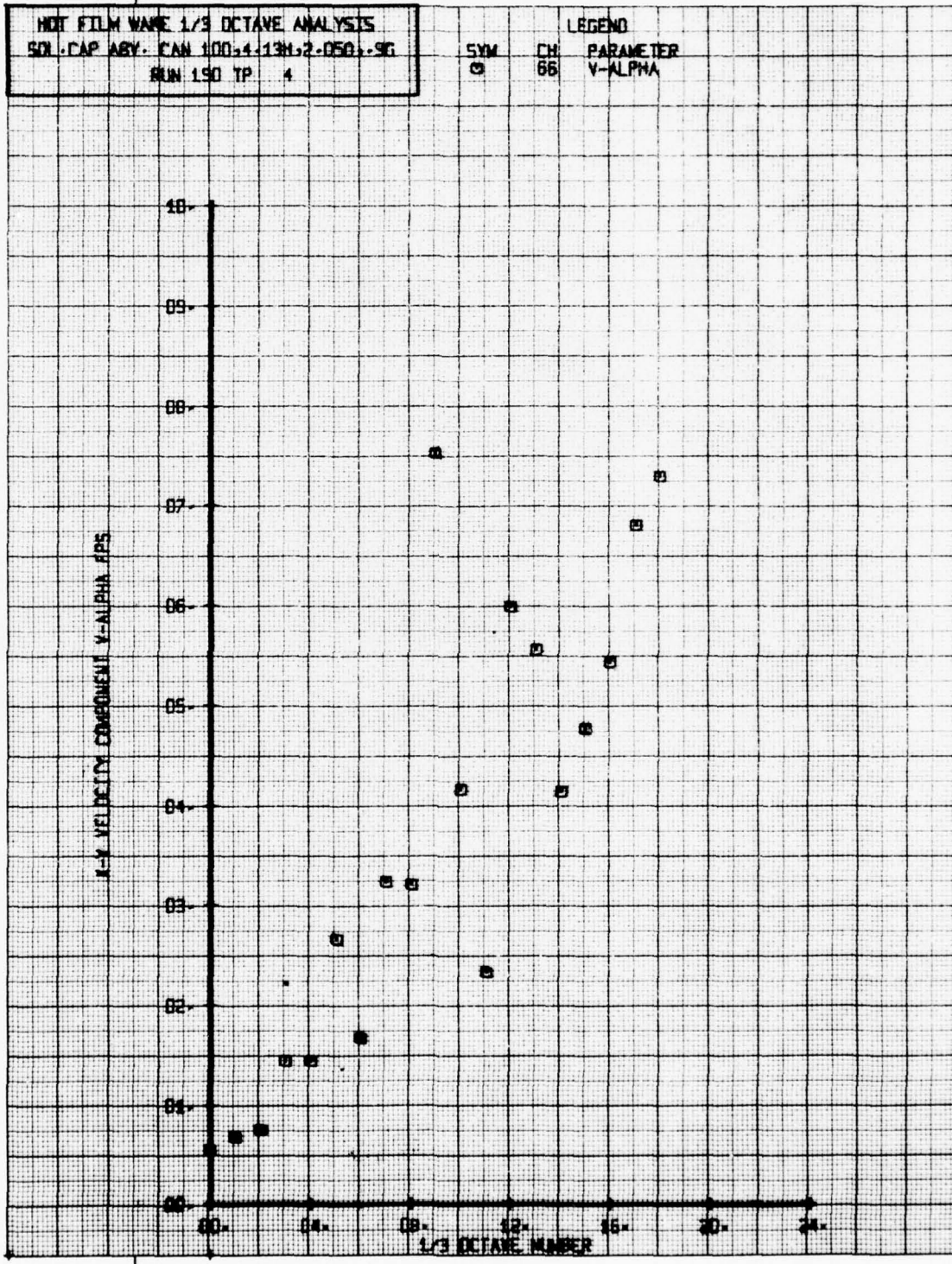


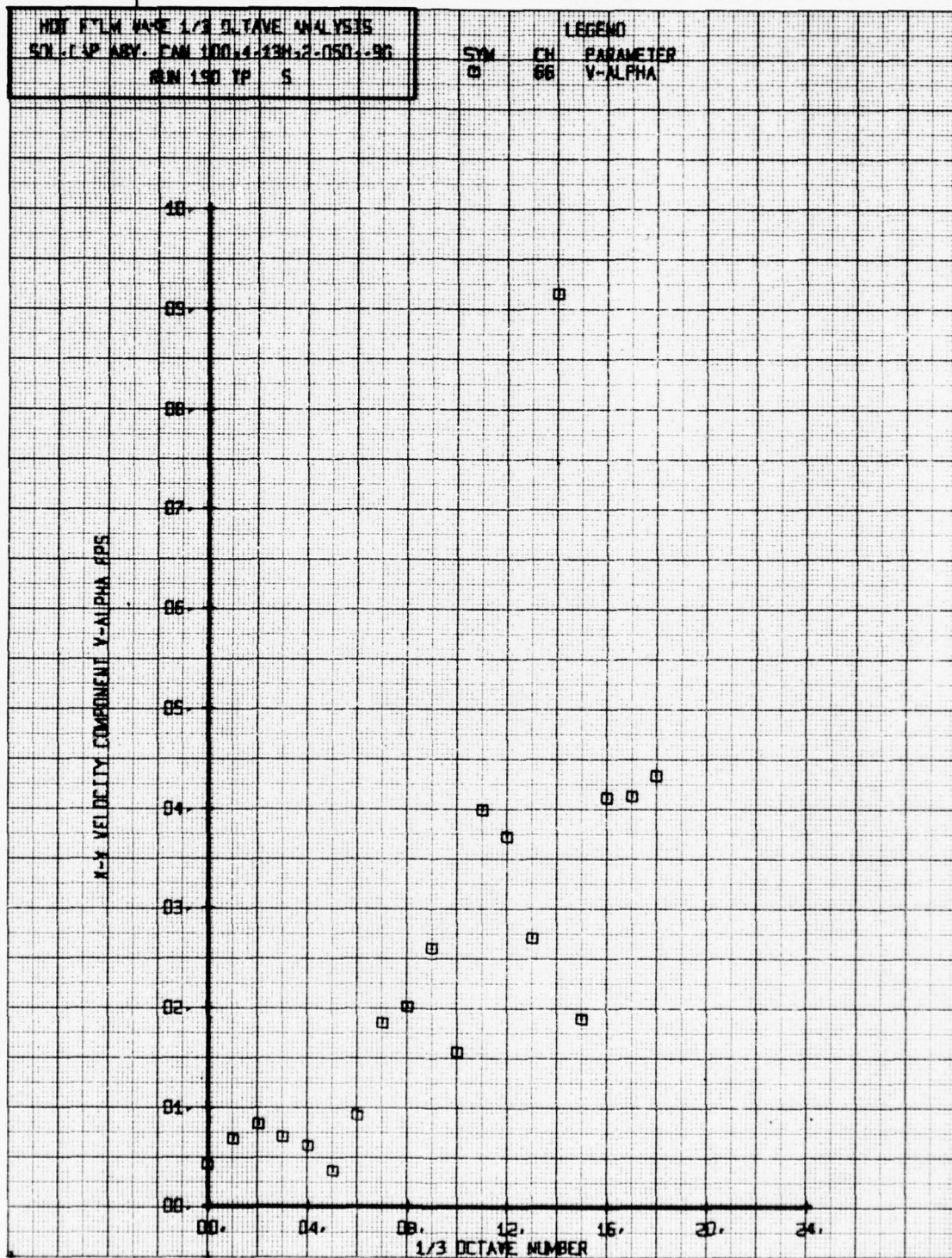


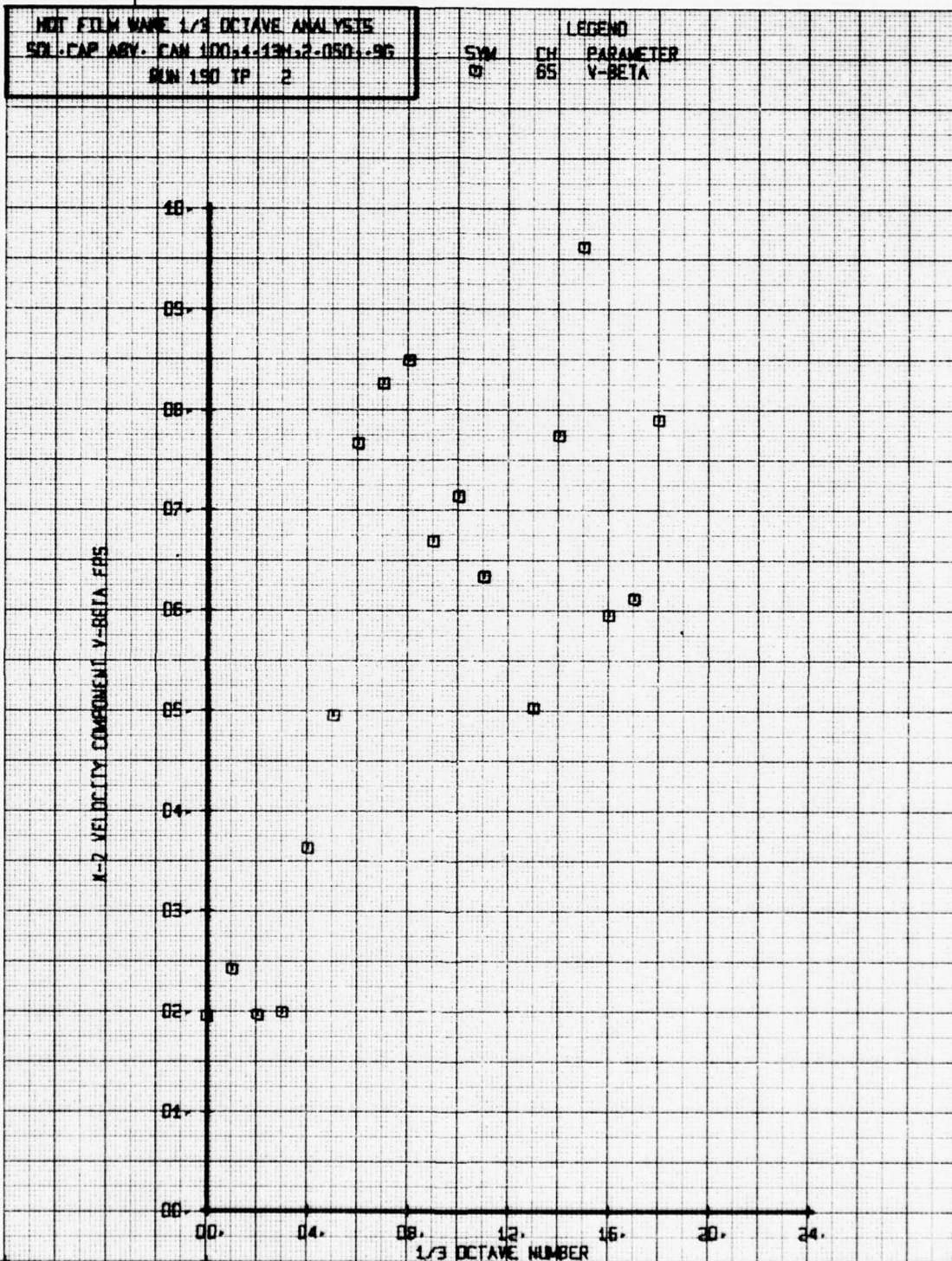


HOT FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100-4-13H-2-050-96
 RUN 150 TP 4

LEGEND
 SYM CH PARAMETER
 O 66 V-ALPHA

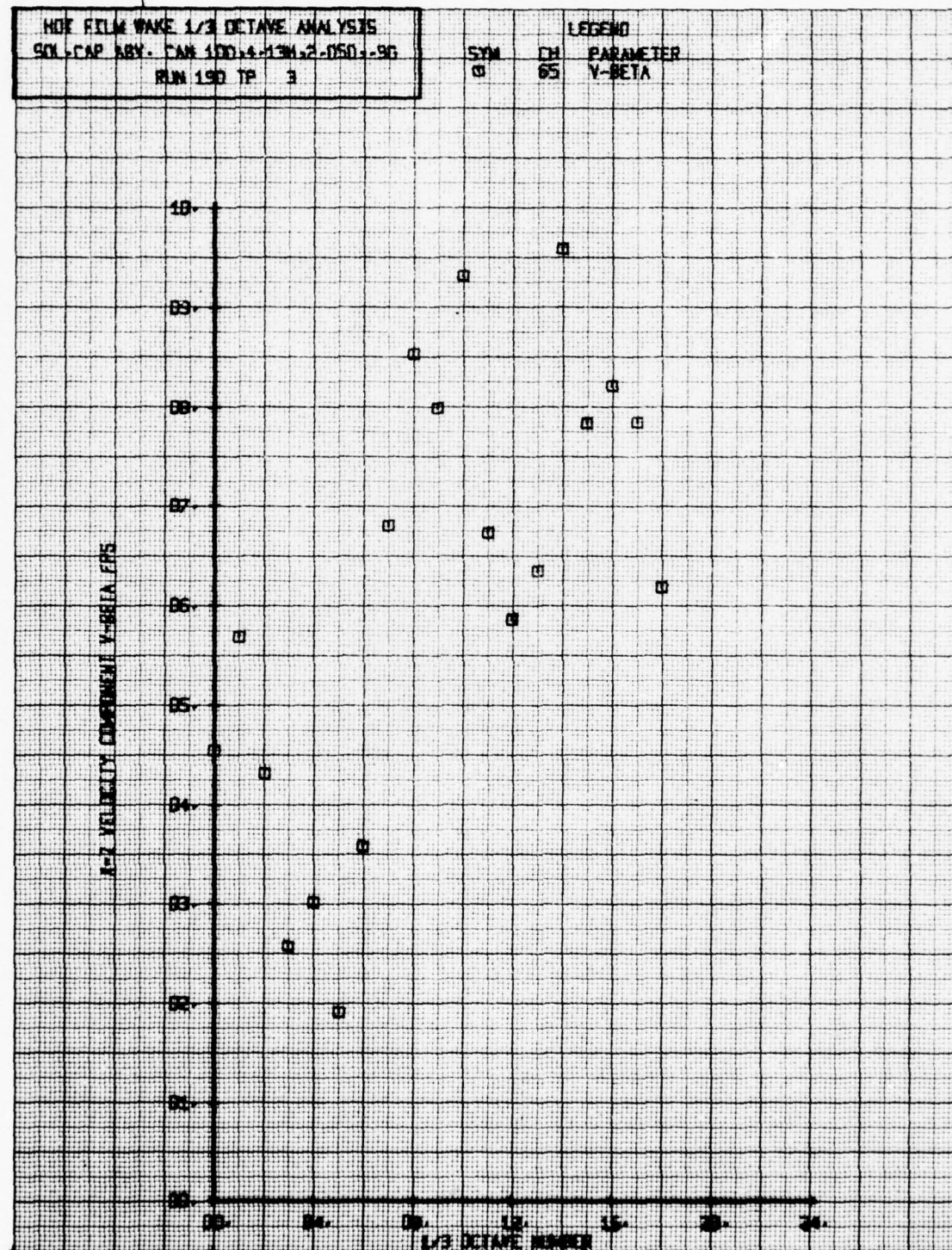


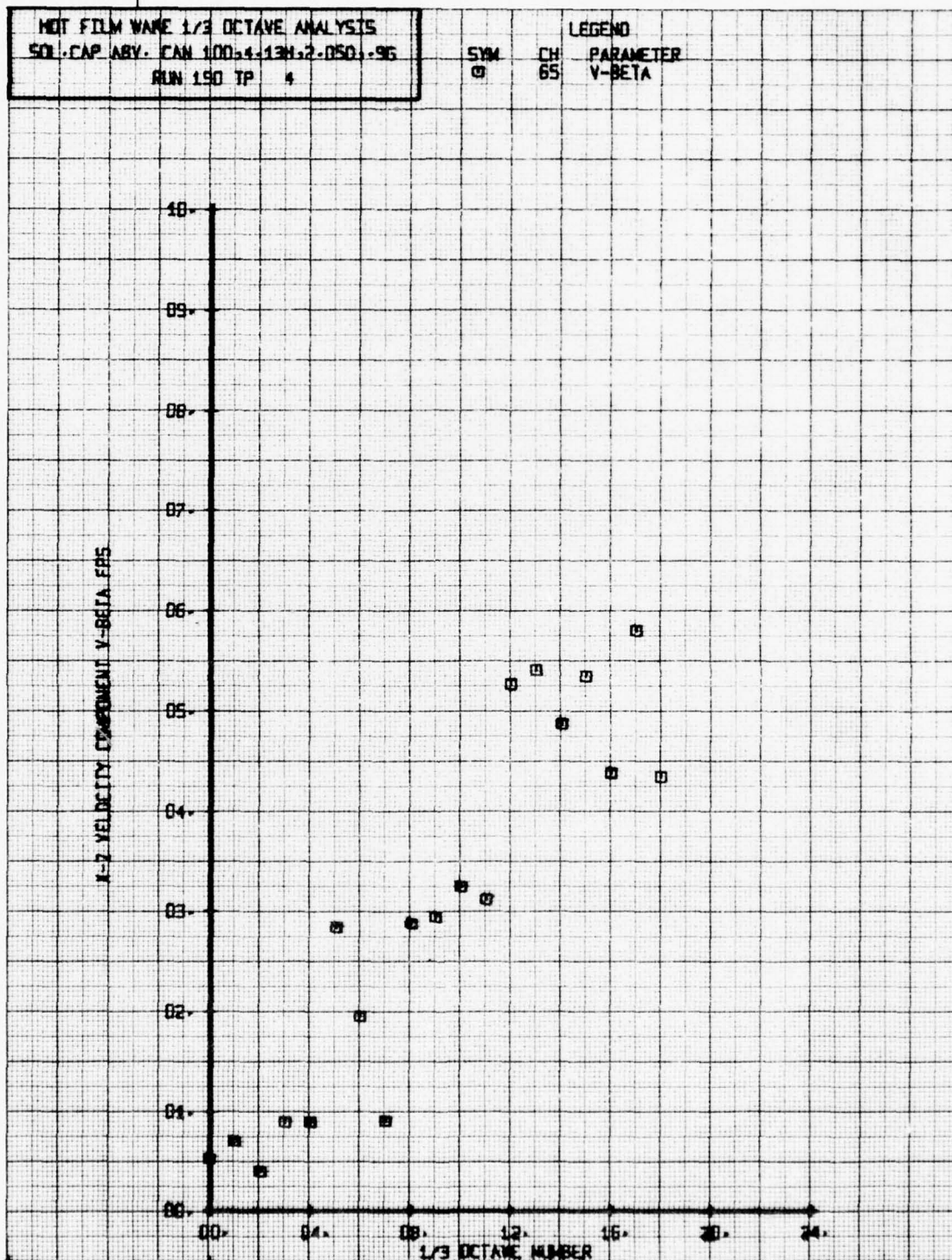




NO. FILM WAVE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100.4-13M.2-050.-96
 RUN 190 TP 3

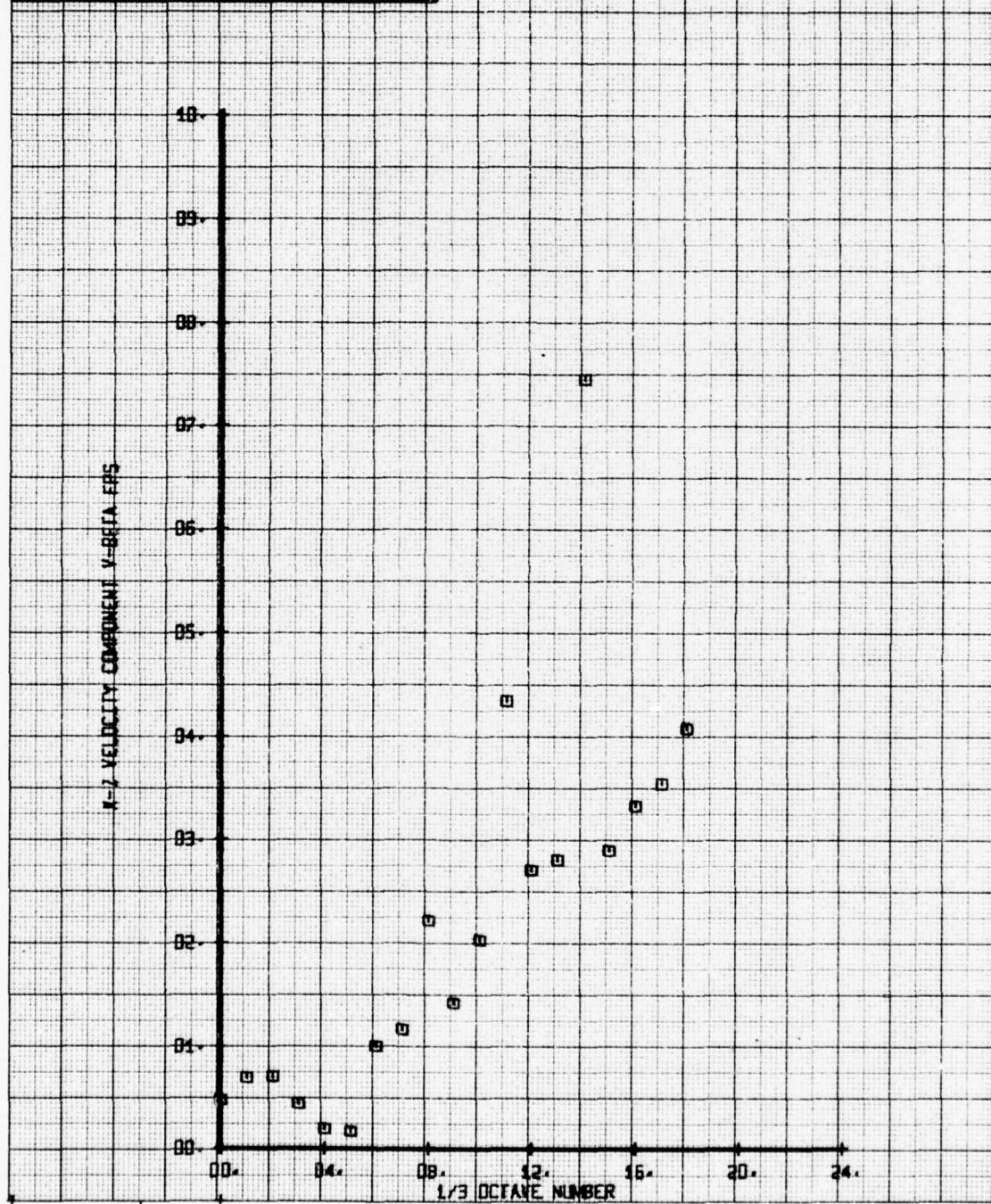
SYM CH PARAMETER
 0 65 V-BETA

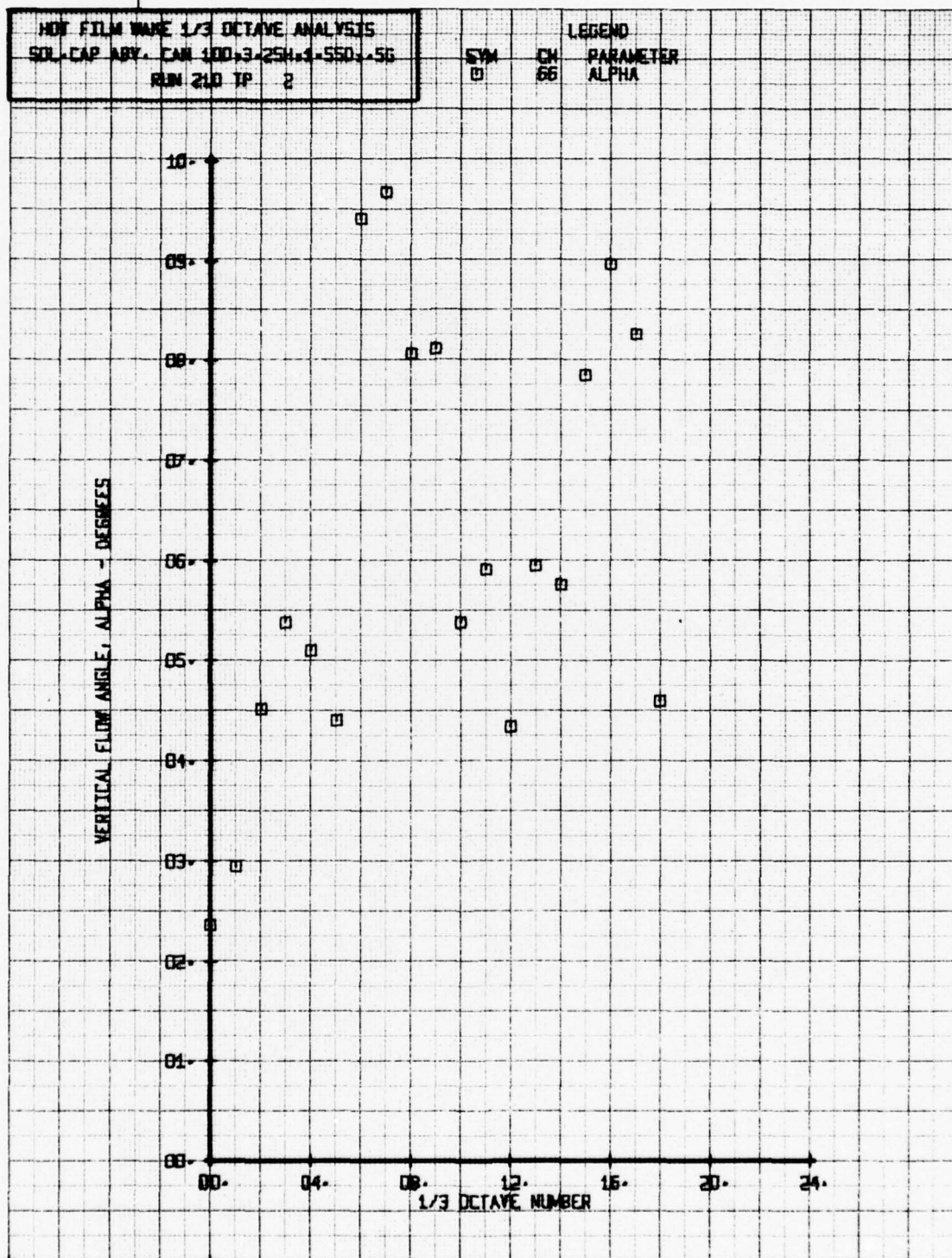




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL-CAP ARY- CAN 100.4.13M.2-050.1-96
 RUN 190 TP 5

SYN CM
 0 65
 PARAMETER
 V-BETA





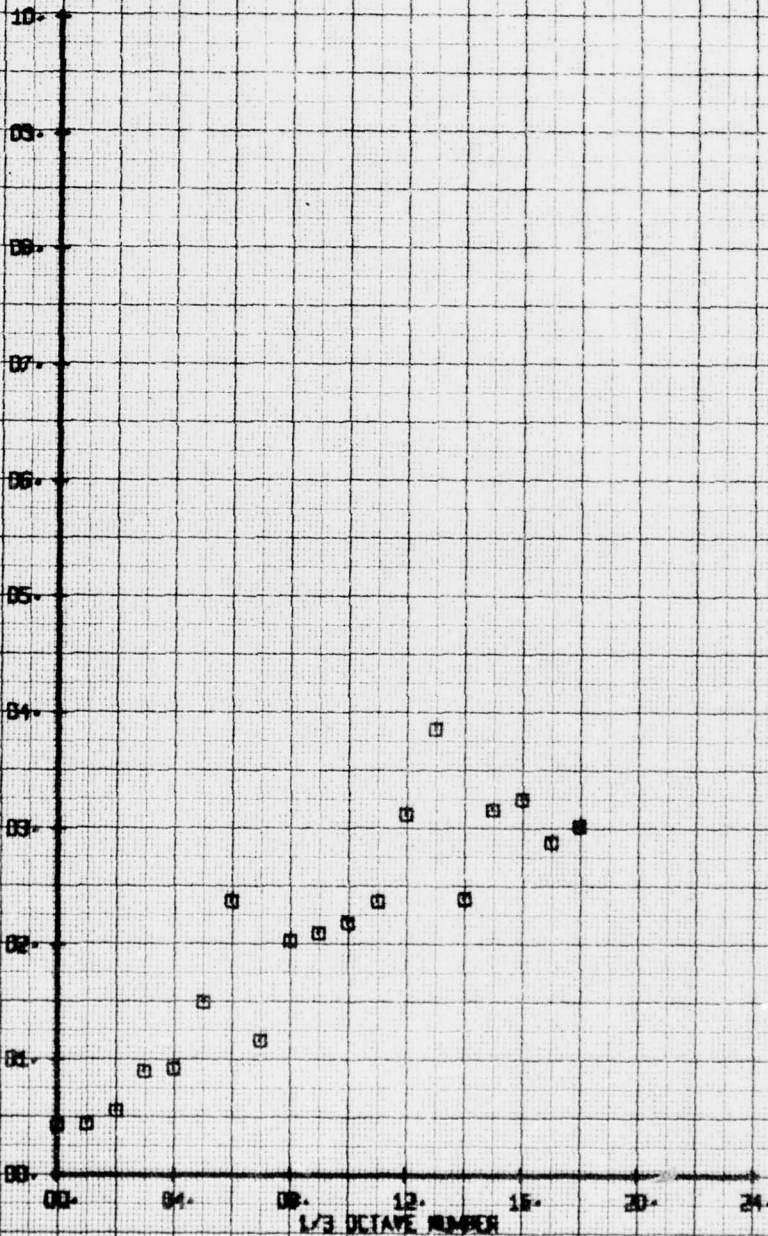
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN 100-3-25H-1-550-56
 RUN 210 TP 3

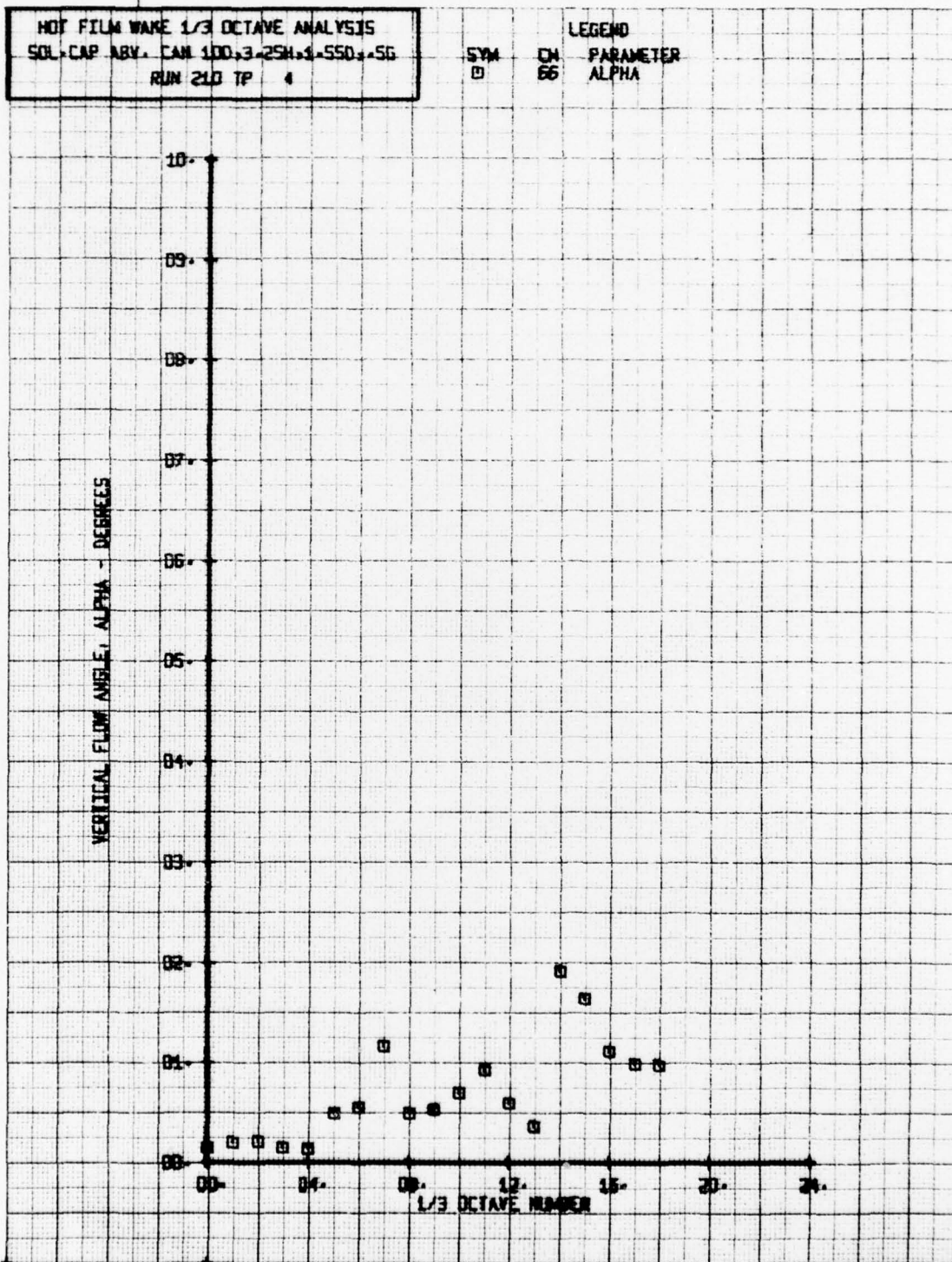
SYM
 □

CH
 66

LEGEND
 PARAMETER
 ALPHA

VERTICAL FLOW ANGLE, ALPHA - DEGREES

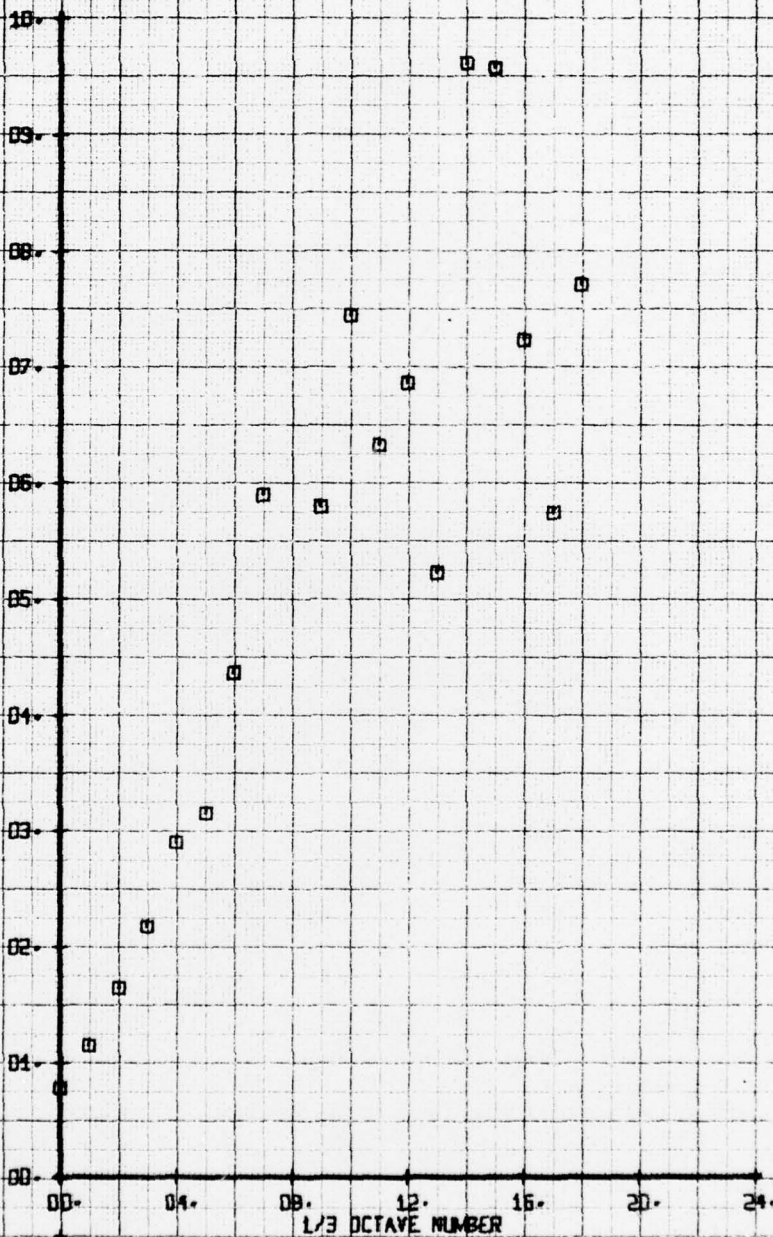


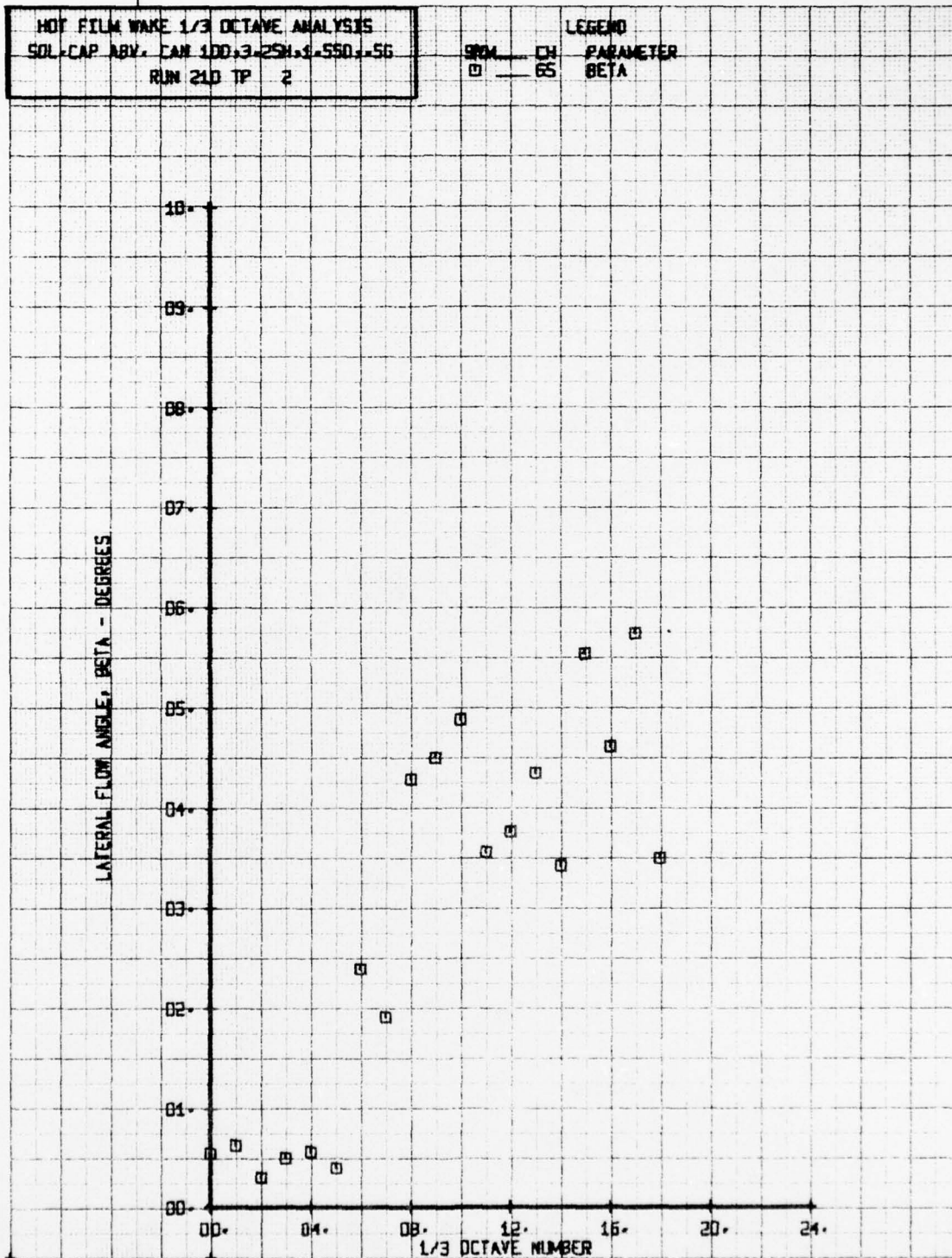


HOI FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL CAP ABY. CAN 100.3-25N.1-550.-56
 RUN 210 TP 1

LEGEND
 SYM CH PARAMETER
 □ 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES

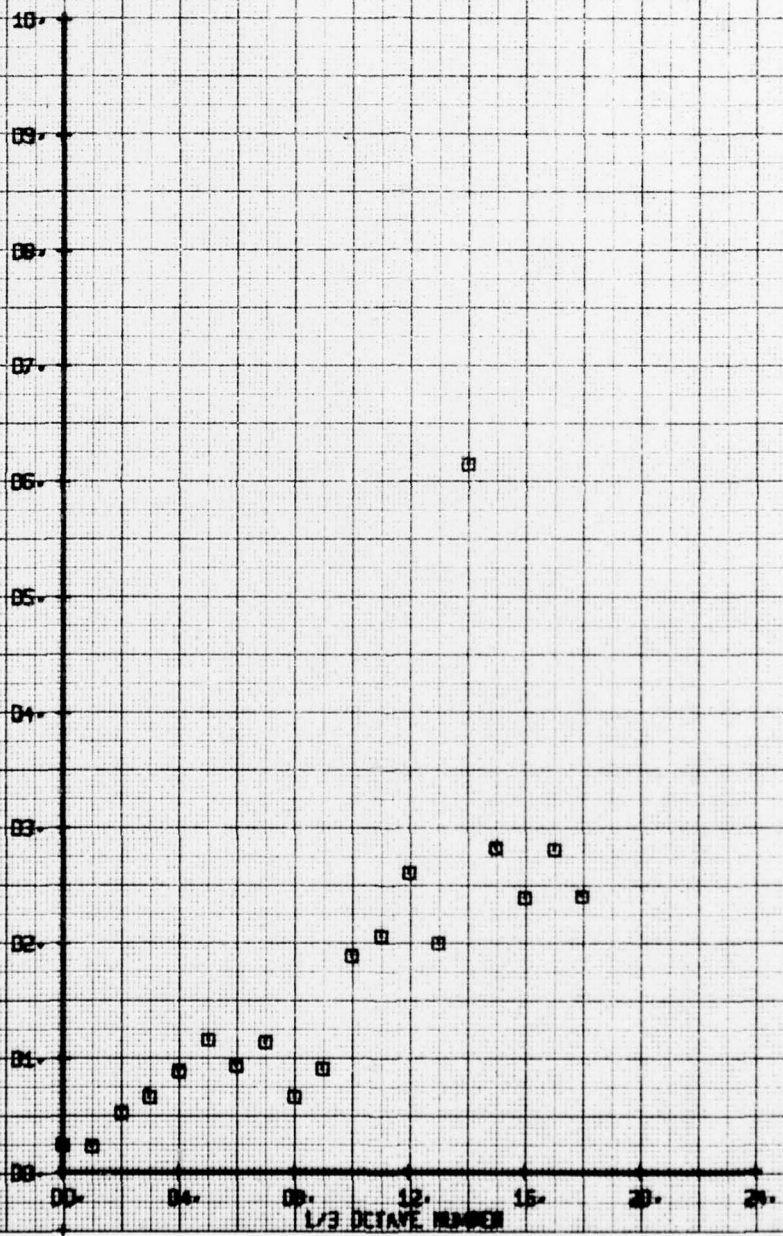




HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL-CAP-ABY. CAM 100.3-25H.1-550.1-56
 RUN 210 TP 3

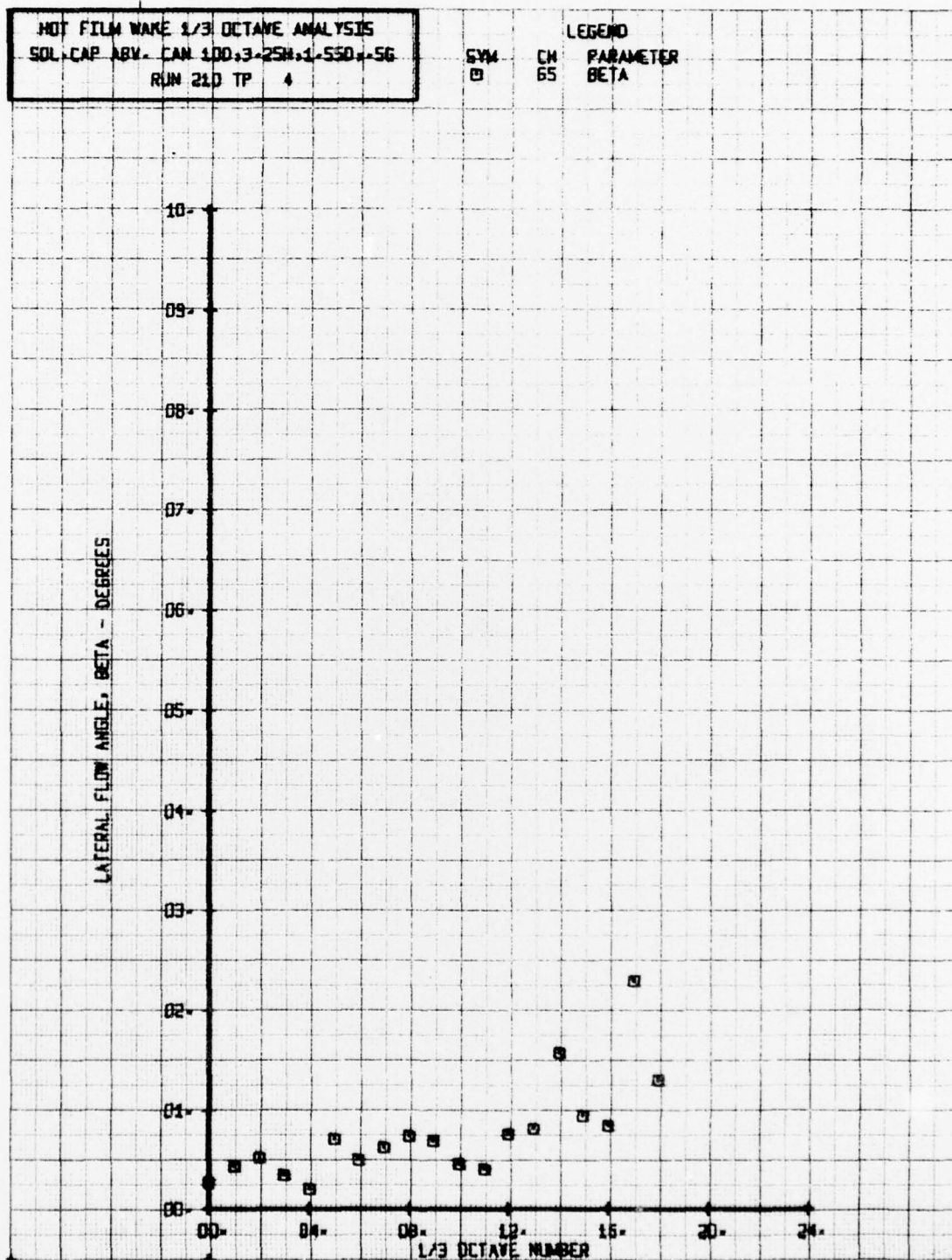
SYM CH PARAMETER
 0 65 BETA

LATERAL FLOW ANGLE, BETA - DEGREES



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN 100.3-25H.1-55D.-56
 RUN 21D TP 4

SYM CH PARAMETER
 □ 65 BETA

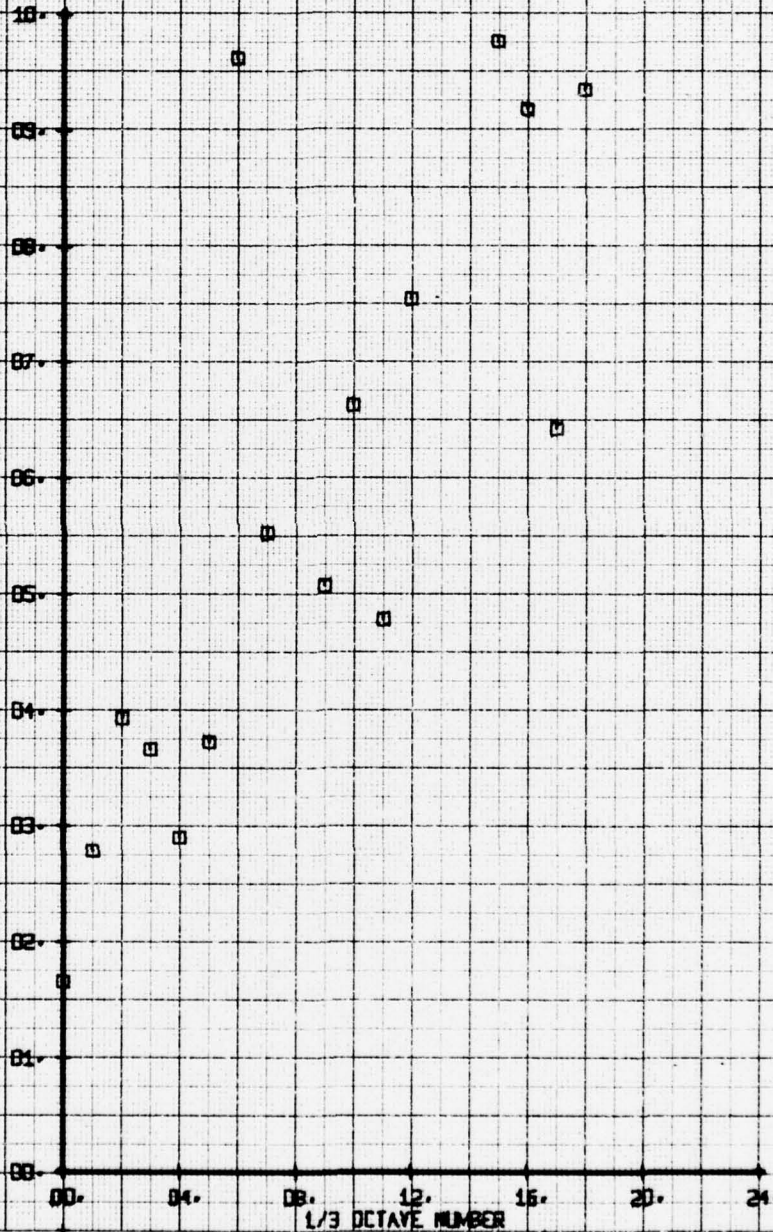


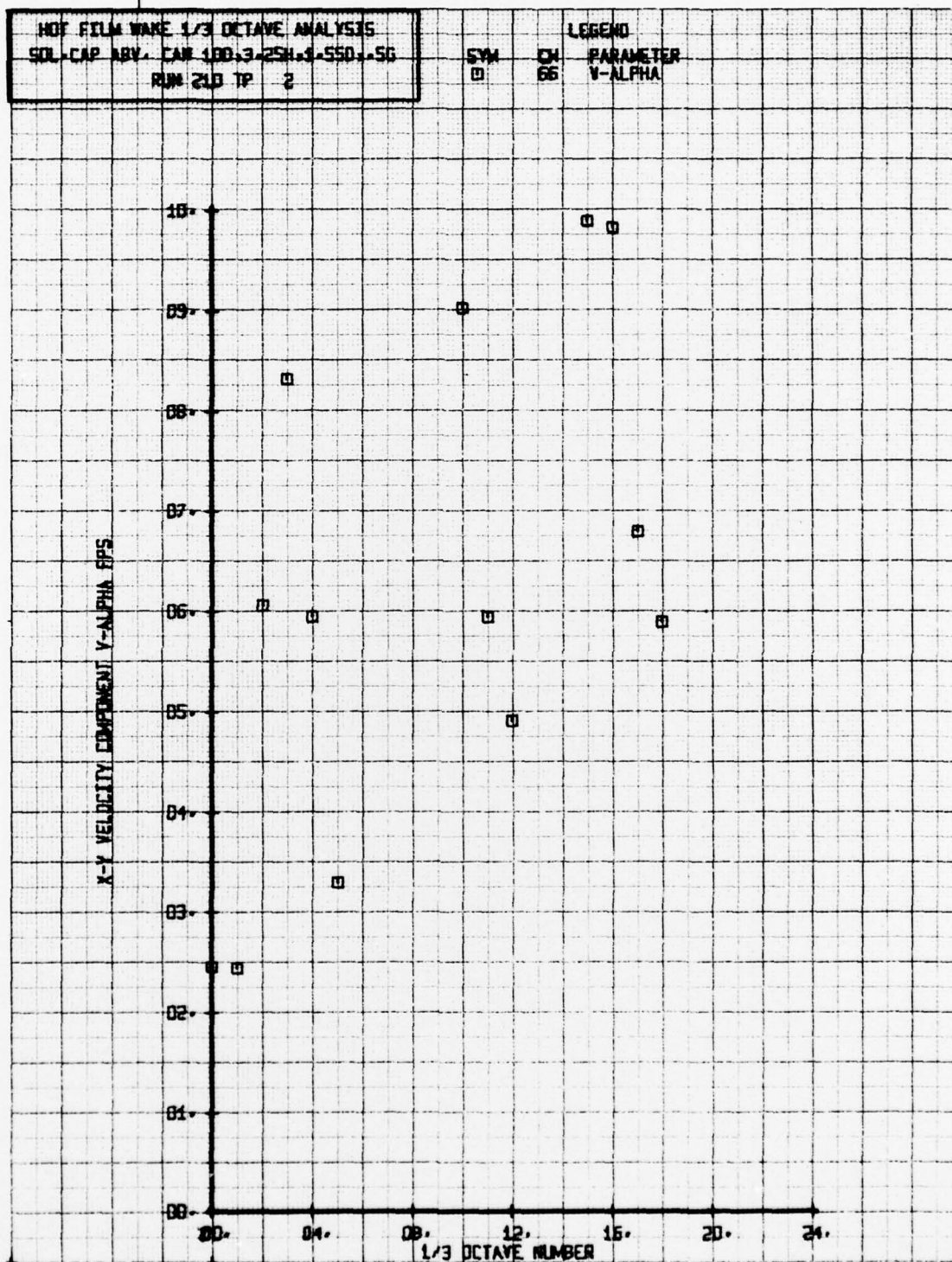
HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL-CAP ABY. CAN 100.3-25N.1-550.-5G
 RUN 210 TP 1

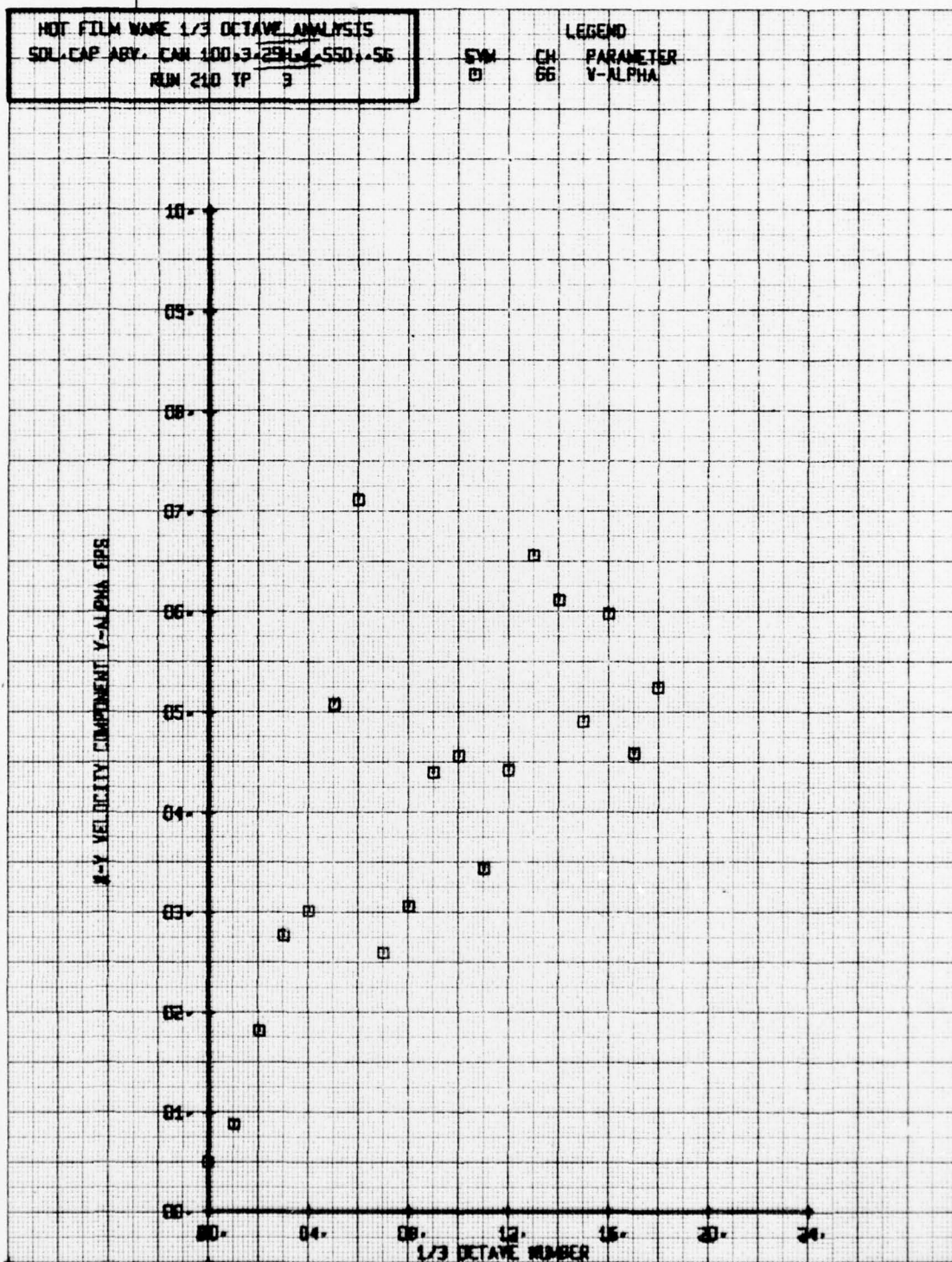
SYM
 □

LEGEND
 CH 04
 66
 PARAMETER
 V-ALPHA

X-Y VELOCITY COMPONENT V-ALPHA RMS

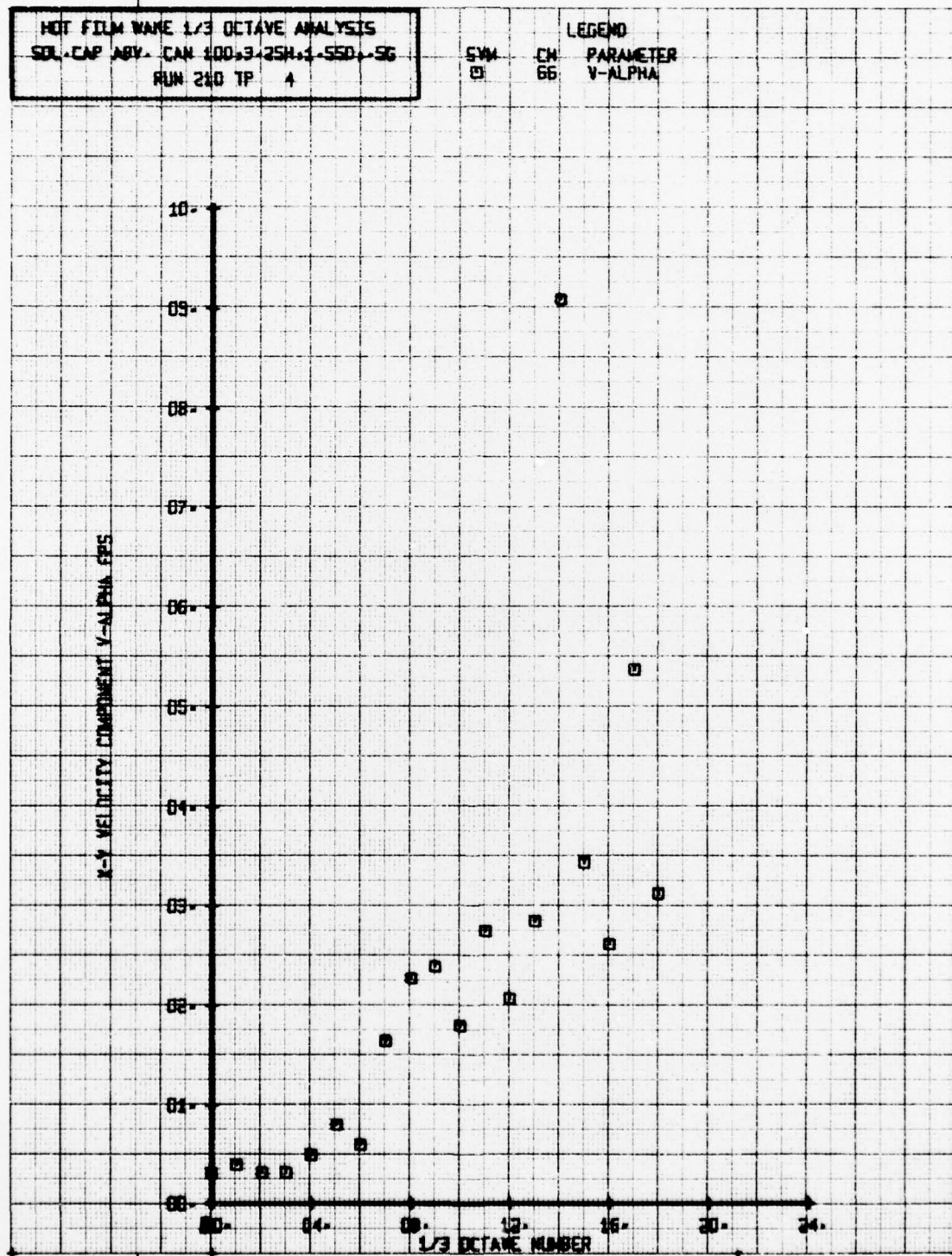


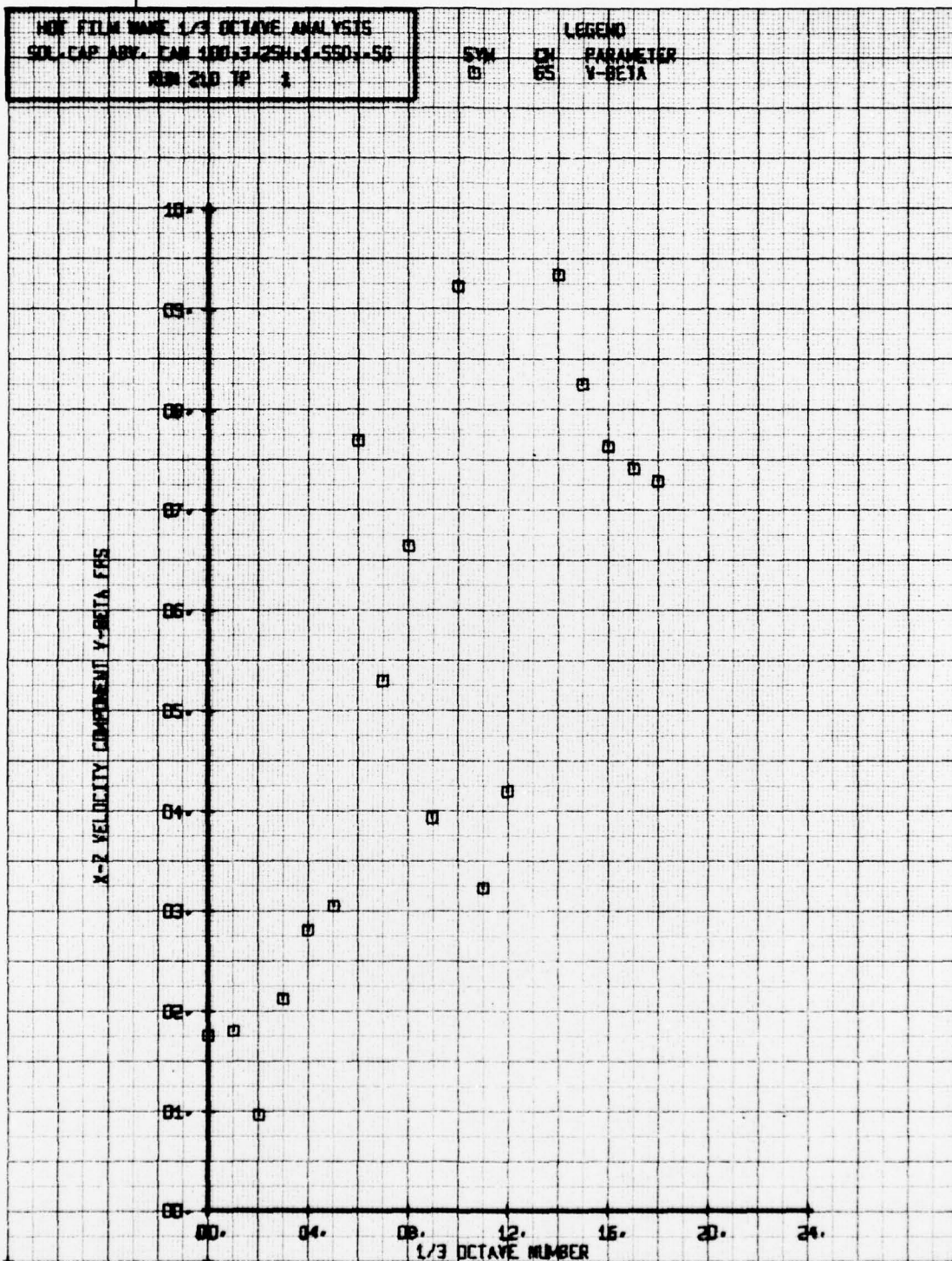


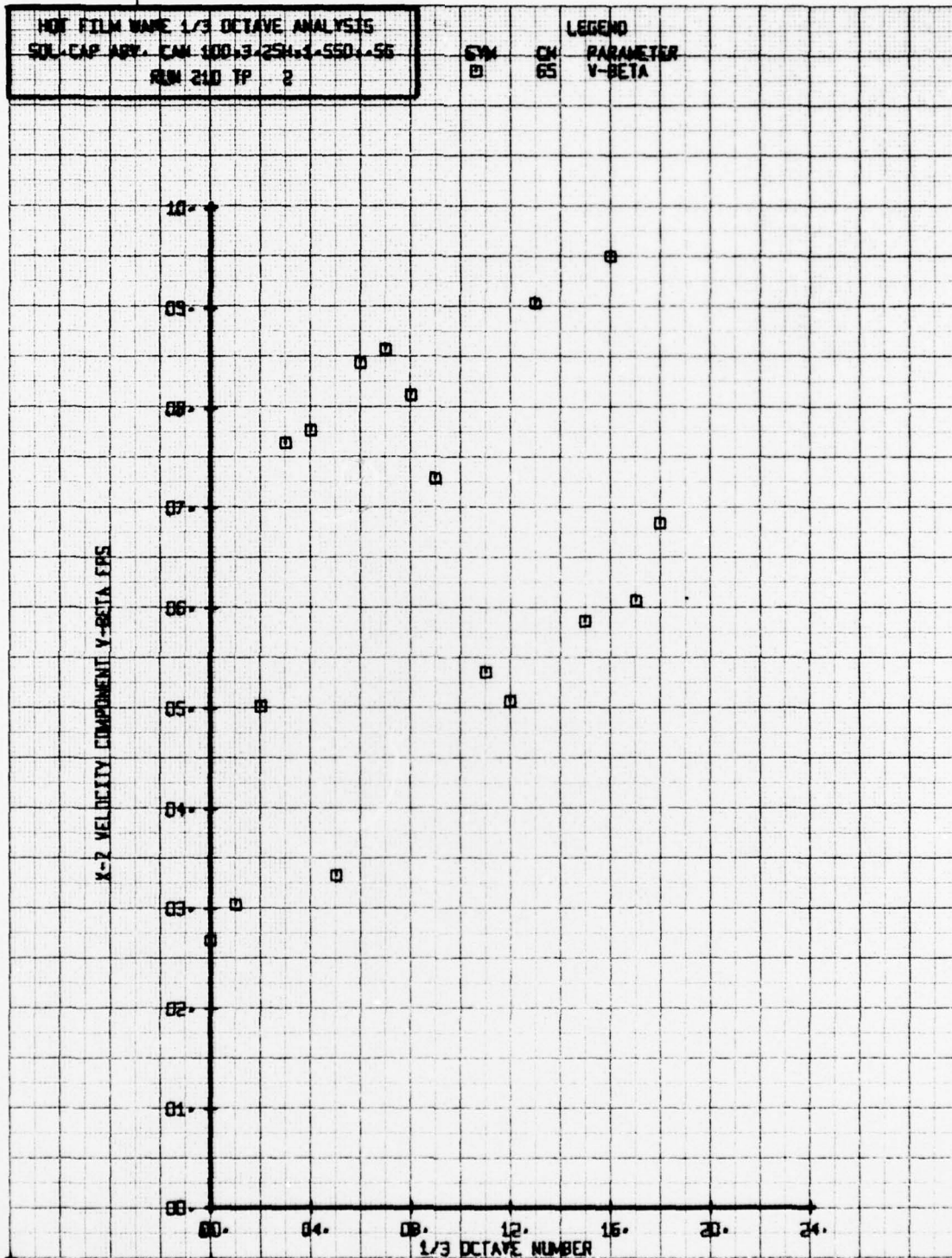


HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN 100-3-25H-1-550-96
 RUN 240 TP 4

SYM CH
 01 66
 LEGEND
 PARAMETER
 V-ALPHA

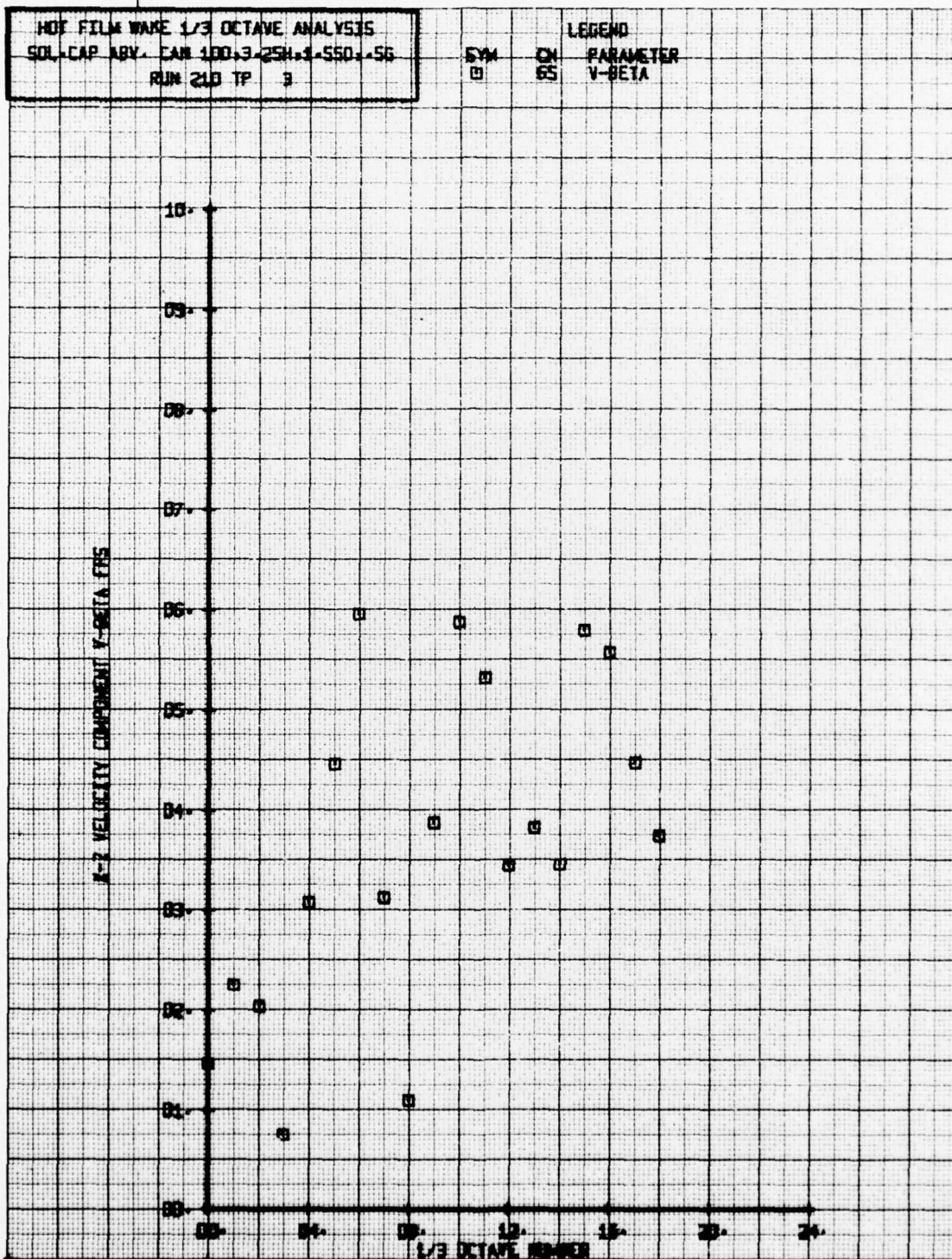






HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ABV. CAN 100.3-25H.1-550.56
 RUN 210 TP 3

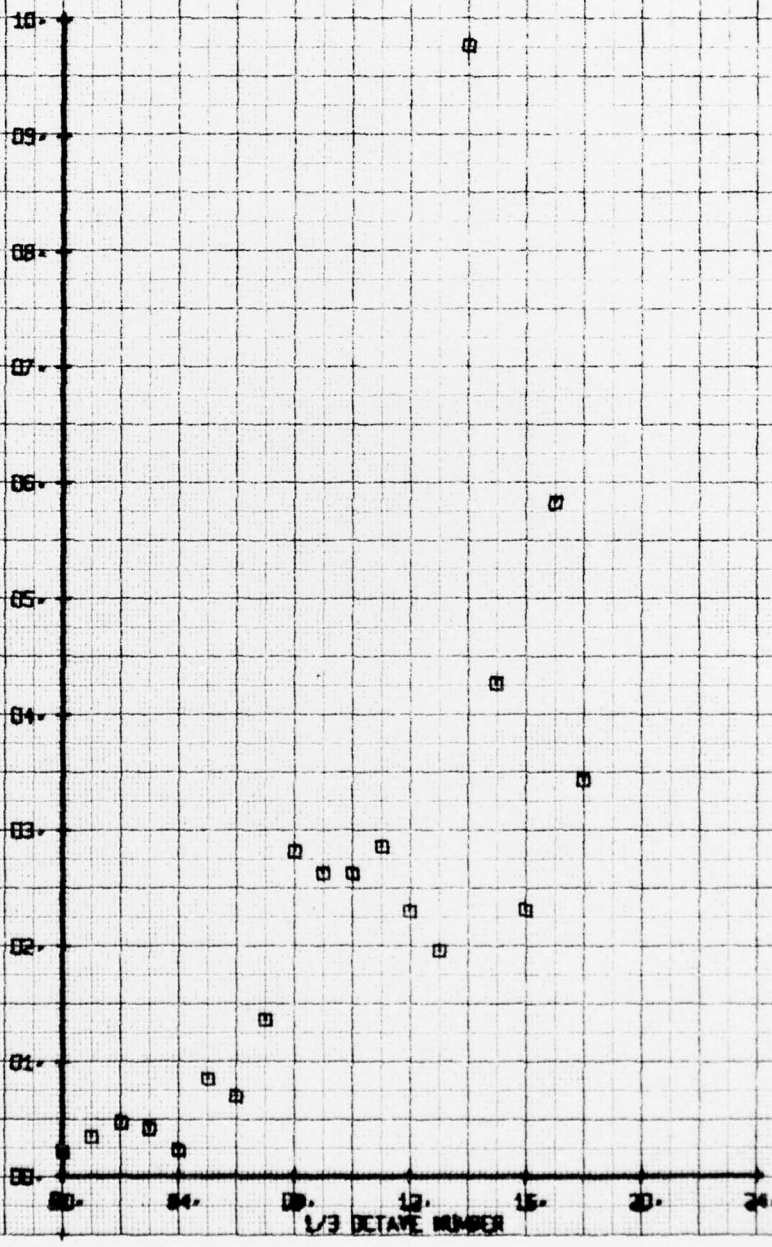
SYM \square CN 65
 PARAMETER
 V-BETA



HOT FILM WAKE 1/3 OCTAVE ANALYSIS
 SOL. CAP. ARY. CAN 100-3-25H-1-550-56
 RUN 210 TP 4

SYM CH PARAMETER
 0 65 V-BETA

X-2 VELOCITY COMPONENT V-BETA EPS



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